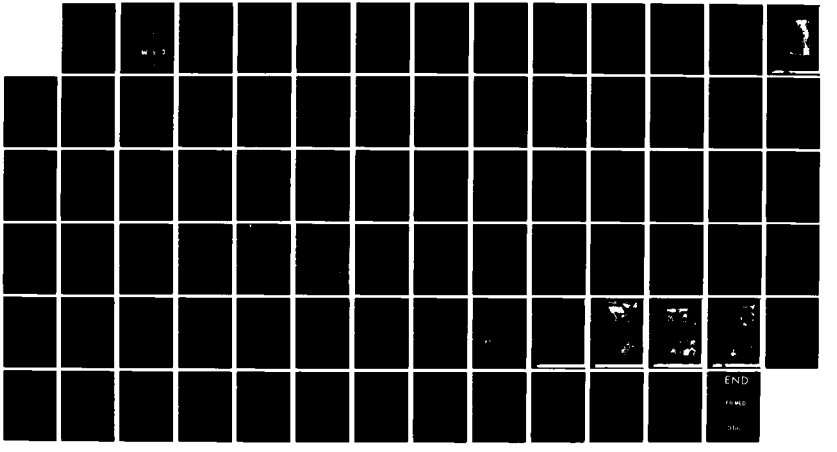
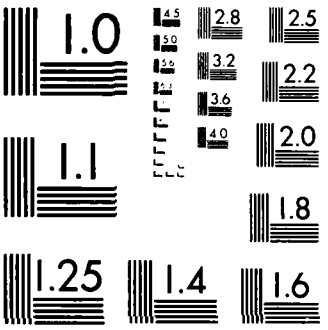
AD-A154 632 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS BROWNS POND DAM MA 00.. (U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV DEC 78 1/1

UNCLASSIFIED F/G 13/13 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

(3)

NORTH RIVER BASIN
PEABODY, MASSACHUSETTS

BROWNS POND DAM
MA 00192

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

DECEMBER 1978

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER MA 00192	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Browns Pond Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE December 1978 13. NUMBER OF PAGES 120
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

North River Basin
Peabody Massachusetts

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Browns Pond Dam is an earthfill embankment about 200-feet long, with a maximum height of about 5-feet and a crest of about 10-feet. The dam has inadequacies and deficiencies which, if not remedied, have the potential for developong into hazardous conditions. The dam is classified as small in size with a low hazard potential.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:

NEDED

JAN 30 1979

Honorable Edward J. King
Governor of the Commonwealth of
Massachusetts
State House
Boston, Massachusetts 02133

Dear Governor King:

I am forwarding to you a copy of the Browns Pond Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Quality Engineering, the cooperating agency for the Commonwealth of Massachusetts. In addition, a copy of the report has also been furnished the owner, the City of Peabody, Public Service Department, Berry Street, Peabody, Massachusetts 01960.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Quality Engineering for your cooperation in carrying out this program.

Sincerely yours,

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

BROWNS POND DAM
MA 00192

NORTH RIVER BASIN
PEABODY, MASSACHUSETTS

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No:	MA 00192
Name of Dam:	BROWNS POND DAM
Town:	PEABODY
County:	ESSEX
State:	MASSACHUSETTS
Stream:	TAPLEY BROOK
Date of Inspection:	16 NOVEMBER 1978

BRIEF ASSESSMENT

Browns Pond Dam is an earthfill embankment about 200 feet long, with a maximum height of about 5 feet and a crest width of about 10 feet. An open topped trapezoidal concrete outlet structure is located at the right abutment contact. A 20-inch diameter cast iron pipe is located at the bottom of the structure and serves as an outlet. Discharges are controlled by a manually operated gate valve located about 200 feet downstream from the structure. A stone masonry spillway is located about 75 feet from the left end of the embankment. Across the width of the spillway is a 1.3 feet high concrete headwall, which serves as an overflow weir. At the bottom of the headwall there is a 15-inch diameter vitrified clay outlet pipe. The intake to the pipe is protected by a steel trash rack. The overflow weir is flanked by stone masonry training walls. Water discharged from the pond through the outlet structure flows underground for a distance of about 5200 feet through a series of 20- and 24-inch pipes into Tapley Brook. The discharges over the spillway and through the spillway outlet pipe flow into a natural channel which ends at a roadway embankment (Lynn Street.)

Phase I inspection and evaluation of Browns Pond Dam does not indicate conditions which would constitute an immediate hazard to human life or property. Based on engineering judgement and the performance of the earth embankment and outlet works, the project appears to be in good condition. The project, however, does have inadequacies and deficiencies which, if not remedied, have the potential for developing into hazardous conditions.

Because there are no data on Maximum Floods for the Browns Pond drainage basin, it was necessary to synthesize a test flood hydrograph for this area. Since the dam is classified as small in size, with a low hazard potential, the test flood, in accordance with Corps of Engineers guidelines is the 50 to 100-year flood. The 100-year flood was selected as the Test Flood and results in an inflow-peak of 771.5 cfs (1056.9 csm), with a runoff volume equivalent to 4.75 inches in 6 hours. The adequacy of the spillway was tested by routing the Test Flood through the reservoir using a computerized routing technique. The peak outflow from the 100-year flood was 63.3 cfs (86.7 csm) at El 81.2 or about 0.9 feet below the top of the dam.

Since the dam is not expected to be overtopped with an inflow equal to the 100-year flood, it is considered that the spillway is adequate from a hydraulic and hydrologic standpoint. Therefore no recommendations and/or further investigations are considered necessary at this time.

Remedial measures are recommended for implementation by the owner, within 24 months of receipt of this Phase I Inspection Report, to improve overall conditions. These measures, in general, are as follows:

- Repairs to embankment and appurtenant structures

- Programs for operation, maintenance and inspection

Eugene O'Brien, P.E.
New York No. 29823

This Phase I Inspection Report on Browns Pond Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

JOSEPH W. FINEGAN, JR., MEMBER
Water Control Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

JOSEPH A. MCELROY, CHAIRMAN
Chief, NED Materials Testing Lab.
Foundations & Materials Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

NORTH RIVER BASIN
BROWNS POND DAM
INVENTORY NO. MA 00192
PHASE I INSPECTION REPORT

CONTENTS

1. GENERAL OVERVIEW OF DAM.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data

There are no design data available for Browns Pond. The watershed is a long narrow valley with relatively low but steep side slopes. The valley, with about 60% urban development, has storage in the form of some small ponds and a swamp. The slopes have very little apparent storage and are almost completely covered by a well established hardwood forest. The drainage area of Browns Pond is 470 acres (0.73 square miles), of which about 8% is occupied by the Pond. There are no streams flowing into or out of Browns Pond. There are no defined downstream channels below the spillway, and outflow over the spillway crest would first fill the depressed area immediately downstream of the dam before flowing across Lynn Street, then downslope into the available storm sewers or overland into Fountain Pond and Spring Pond.

b. Experience Data

It is reported by persons interviewed that to their knowledge the dam has never been overtopped.

c. Visual Inspection

At the time of inspection, the water level was at about El 73.1, 3 feet below the invert of the outlet pipe located inside of the outlet structure. Both outlet structure and pipe are in generally good condition. The spillway is in fair condition. The spillway approach channel is partially blocked by debris and stone blocks fallen from the upstream training walls. The downstream training walls are in fair condition with a few stone blocks from the upper courses of the wall having fallen into the channel. For further details see Section 3.1.

d. Overtopping Potential

The potential for overtopping the dam was investigated on the basis of the adequacy of the spillway and the available surcharge storage to meet a potential emergency inflow. The dam, with a height of five feet and a maximum storage of 280 acre-feet [1/*] is classified as small.[2/] In order to estimate the downstream hazard potential in the event of a dam failure, the U.S. Corps of Engineers' "Rule of Thumb" guidance was used. The estimate assumes the following: a) the reservoir surface is at the top of the dam at the time of the breach, b) a breach of 80.0 feet, equal to 40% of the dam length at mid-height, occurs, and c) the downstream channel has an average roughness coefficient (n) of 0.07. The hypothetical flood wave height was estimated at locations 30, 2130, 3480 and 5210 feet downstream from the dam. The following results were obtained:

---

* Numbers denote references listed at the end of the Section.

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

Operating procedures for the project are not formally established but are based on the experience of the operating personnel.

4.2 MAINTENANCE OF DAM

There is no formal maintenance manual for the project. It is reported that maintenance is carried out as needed. There is no scheduled program of inspection by the owner. Although the State has had a program of dam inspection since 1968, it is reported that Browns Pond Dam has not been inspected under this program. Prior to 1968, Essex County conducted inspections from 1912 to 1968 and a summary of their inspection reports is given in the Appendix.

4.3 MAINTENANCE OF OPERATING FACILITIES

There is no established maintenance program for the operating facilities.

4.4 WARNING SYSTEMS IN EFFECT

There is no warning system in effect nor one planned.

4.5 EVALUATION

The maintenance and operating procedure for the dam and appurtenant structure are considered deficient. Measures to improve these deficiencies are given in Section 7.

have fallen into the spillway approach channel. In addition, minor debris has accumulated in the channel. At several locations along the walls, mortar in the joints is loose and missing. At the time of inspection, there was a steel plate flashboard at the entrance to the spillway. (See Photograph No. 6).

The downstream training walls are in fair condition; only a few stone blocks from the upper courses have fallen into the channel. At several locations on both training walls the mortar is loose and missing. About 20 feet downstream from the spillway headwall, a 5-foot section of the 15-inch diameter clay outlet pipe is broken.

d. Abutments

There were no signs of seepage or other unusual conditions at the abutments. At the left abutment there is a high voltage transmission tower. (See Photograph No.3.)

e. Downstream channel

A poorly defined natural channel of 250 feet length abruptly ends at the Lynn Street roadway embankment and is overgrown with heavy vegetation, trees, bushes, saplings and grass. There are also high voltage transmission towers located in this vicinity (See Photograph No.7.)

f. Reservoir Area

In the vicinity of the dam, there is no evidence of potentially unstable slopes or other unusual conditions which would adversely affect the dam.

3.2 EVALUATION OF OBSERVATIONS

Visual observations made during the course of the inspection revealed several deficiencies which at present do not adversely affect the adequacy of the dam. However, these deficiencies do require attention and should be corrected before further deterioration leads to a hazardous condition. Recommended measures to improve these conditions are given in Section 7.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

A visual inspection of Browns Pond Dam was made on 16 November, 1978. The weather was sunny, temperature between 50° and 55° F. The last rainfall reportedly occurred two weeks before the inspection. At the time of inspection the pond level was at about El 73.1, i.e. 9 feet below the top of dam.

b. Embankment

The earthfill embankment appears in generally good condition. The horizontal and the vertical alignments of the crest are generally good. There is, however, some erosion on a path, created by pedestrian traffic, for a distance of 125 feet starting at the left abutment. (See Photograph No. 2). Also at several locations, the crest edge on the upstream side has been eroded. (See Photograph No. 8). Neither longitudinal nor transverse cracks are visible on the crest, which is covered by heavy growth of trees, saplings, bushes and overgrown grass.

The upstream slope is in relatively fair condition. The upstream slope between the normal water level and the crest edge exhibits large expanses of erosion and sloughing. No slope protection is provided on the upstream slope. (See Photograph No. 3).

The downstream slope does not show any signs of erosion or sloughing. The slope is completely covered with heavy vegetation including trees, sapling, bushes and overgrown grass. Along the toe of the slope, starting from the right abutment for a distance of 75 feet, erosion has occurred resulting from pedestrian traffic. (See Photograph No. 1).

c. Appurtenant Structures

The concrete outlet structure and the 20-inch diameter cast iron outlet pipe which is protected by a steel trash rack are in good condition. The pipe shows minimal rusting and the condition of the concrete is good. (See Photograph No.4). It is reported that the gate valve for the outlet pipe is in operating condition.

The spillway is in good condition with the upstream training walls in fair condition. The stone blocks of the upper courses of both walls

c. Validity

In general, the information obtained from the available drawings, the past inspection reports, and the personal interviews is consistent with observations made during the inspection and therefore considered reliable.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Design data and specific memoranda are not available for the original construction of the dam. There are drawings showing the survey data for the pond (see Appendix) and a plan and profile of the outlet structure and pipe combination in the files of the Owner. The elevations shown on the above drawing refer to the Peabody Water Department datum. There is no correlation available between the Peabody datum and the USGS datum. However, located on the upstream slope of Spring Pond Dam near the left abutment there is a bench mark whose elevation is reportedly based on USGS datum. At the time of the inspection, the elevation of the top of the Spring Pond Dam using this bench mark was determined by levelling. Comparing this elevation to the one shown for the top of dam on the above drawing indicates the Peabody datum to be 3.77 feet above the USGS datum. Therefore, elevations of the top of dam and inverts of the outlet pipes were adjusted by this value.

2.2 CONSTRUCTION RECORDS

There are no construction records available.

2.3 OPERATION RECORDS

No operation records are available and there are no daily records of the pond elevation and rainfall at the dam site.

2.4 EVALUATION OF DATA

a. Availability

Existing information was made available by Water Division, Public Service Department, Peabody, Mass.; Engineering Department, County of Essex, Salem, Mass.; and Department of Environmental Quality Engineering, Division of Waterways, Boston, Mass.

b. Adequacy

The lack of in-depth engineering data did not allow for a definitive review. Therefore the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily visual inspection, past performance history and sound engineering judgement.

i. Spillway (continued)

U/S channel	None
D/S channel	See description in Sections 1.2 and 3.1

j. Regulating Outlets

The regulating outlets consist of an outlet structure and a spillway.

The concrete outlet structure, trapezoidal in plan, is 7 feet wide and 2.8 feet high with sidewalls 7 feet and 11.5 feet long. The outlet from the structure is a 20-inch diameter cast iron pipe whose invert is at about El 75.0. Discharges through the pipe are manually controlled by a gate valve located 200 feet downstream.

The stone masonry spillway is 6 feet wide with a freeboard of about 3.5 feet. At the upstream end of the spillway there are provisions for flashboards; at the downstream end there is a 1.5 feet high concrete headwall surrounding a 15-inch diameter vitrified clay pipe.

Discharges from the intake structure flow underground about 5200 feet through a series of 20- and 24-inch diameter pipes into Tapley Brook. The discharges from the spillway are into a natural channel. The channel ends abruptly at the Lynn Street roadway embankment. The location of the discharge end of the spillway outlet pipe is not known.

e. Storage (acre-feet)

Recreation pool	54
Flood control pool	Not Applicable
Design surcharge	Unknown
Test flood surcharge (net)	175
Top of dam	280

f. Reservoir Surface (acres)

Top of dam	57.3
Test flood pool	55
Flood-control pool	Not Applicable
Recreation pool	37
Spillway crest	49.9

g. Dam

Type	Earth
Length, feet	200±
Height, feet	5±
Top width, feet	10
Side Slopes - Upstream	1V on 2.5H near top then 1V on 1H and 1V on 10H remainder to the water line
- Downstream	1V on 4.5H
Zoning	Unknown
Impervious core	Unknown
Cutoff	Unknown
Grout curtain	Unknown

h. Diversion and Regulating Tunnel

Type	Not Applicable
Length	Not Applicable
Closure	Not Applicable
Access	Not Applicable
Regulating facilities	Not Applicable

i. Spillway

Type	Broad-crested
Length of weir, feet	6.0
Crest elevation, feet	79.0

2000 ft in length, with an area of 37.2 acres or 8% of the total area. The valley, with about 60% urban development, has storage in the form of some small ponds and a swamp. The slopes have very little apparent storage and are almost completely covered by a well established hardwood forest.

b. Discharges at Damsite

Discharges from Browns Pond are over a concrete weir with an outlet pipe and over an open topped outlet structure from which water is discharged through a cast iron pipe.

The spillway consists of a concrete overflow headwall 6 feet wide and 1.5 feet high which surrounds a 15-inch diameter vitrified clay outlet pipe. The computed maximum discharge capacity, with the pond level at El 81.25, is 67.0 cfs.

The height of the trapezoidal concrete outlet structure is 2.8 feet, its width 7 feet. The length of the sidewalls is 7 feet and 11.5 feet. A 20-inch diameter cast iron pipe is located at the bottom of the structure; its invert is at about El 75.0. The computed maximum discharge with head equivalent to El 81.2 is about 10 cfs.

c. Elevation (feet above MSL)

Top of dam	82.1
Maximum pool-design surcharge	Unknown
Maximum pool-test flood	81.2
Full flood control pool	Not Applicable
Recreation pool	77.6
Spillway crest (gated)	Not Applicable
Upstream portal invert diversion tunnel	Not Applicable
Downstream portal invert diversion tunnel	Not Applicable
Streambed at centerline of dam	Unknown
Maximum tailwater	Unknown

d. Reservoir (feet)

Length of maximum pool	1920±
Length of recreation pool	1900
Length of flood control pool	Not Applicable

e. Design and Construction History

Original design and construction records are not available. The exact year the dam was built is unknown but reportedly the dam was constructed about 1900. Past inspection reports, summaries of which are in the Appendix, indicate that over the years several changes and repairs have been made to the appurtenances. It should be noted that the upstream face of the intake structure had a weir notch with provisions for flashboards. Recently the notch was filled with concrete.

f. Normal Operating Procedure

There are no normal operating procedures for the project. The pond is allowed to establish its own level.

g. Size Classification

The dam is less than 40 feet high and has a storage capacity less than 1000 acre-feet, therefore is classified as a "small" dam.

h. Hazard Classification

The dam is in a "low" hazard potential category because analysis indicates that a shallow depth flood wave would result from a dam failure. The wave would probably cause minimal property damage with probably no loss of life. For details on selection of the hazard potential category see Section 5.1d.

i. Operator

The person responsible for the day-to-day operation of the dam is:

Mr. Alan Taubert, Director
Water Division
Public Service Department
Berry Street
Peabody, Mass.
Phone: (617) 531-5135 (Office)
(617) 535-3652 (Home)

1.3 PERTINENT DATA

a. Drainage Area

The drainage area contributing to Browns Pond is 470 acres (0.73 square miles) with a length to width ratio of about 4. The Pond is approximately

with a maximum height of about 5 feet and a crest width of about 10 feet. The upstream slope is broken and is about 1V on 10H adjacent to the water line, then about 1V on 1H and finally 1V on 2.5H near the crest. The downstream slope is grassed and is about 1V and 4.5H.

An open topped trapezoidal concrete outlet structure is located at the right abutment contact. The height of the structure is 2.8 feet, its width 7 feet. Length of the sidewalls is 7 and 11.5 feet. A 20-inch diameter cast iron pipe is located at the bottom of the structure and serves as the outlet. (See Photograph No. 4). Discharges are controlled by a manually operated gate valve located about 200 feet downstream. Downstream of the gate valve, the pipe is 24-inch diameter vitrified clay and about 5000 feet long. It discharges into Tapley Brook adjacent to the Spring Pond Pumping Station on the left abutment of the Fountain Pond Dam (commonly called the Lower Spring Pond Dam).

A stone masonry spillway 6 feet wide, 3.5 feet high and 11 feet long is located about 75 feet from the left end of the embankment. The overflow weir consists of a concrete headwall, 1.5 feet high, 1 foot thick, which is located at the downstream end of the spillway. At the bottom of the headwall there is a 15-inch diameter vitrified clay outlet pipe of unknown length. The intake of the pipe is protected by a steel trash rack. About 11 feet upstream of the headwall there are provisions for flashboards. The top of the spillway is covered by stone slabs. The overflow weir is flanked, upstream and downstream by stone masonry training walls, 14 feet long by 3.5 feet high and 7 feet long by 3.0 feet high, respectively. (See Photograph No. 6). Discharges over the weir are into a natural channel.

b. Location

The dam is located in the southern portion of the City of Peabody, just north of the Peabody-Lynn borderline, south of the intersection of Lynn Street and Fairview Avenue.

c. Ownership

Browns Pond Dam is owned by the City of Peabody. The day-to-day operation and maintenance is managed by the Water Division, Public Service Department, Peabody, Massachusetts.

d. Purpose of Dam

The impoundment provided by the dam is for recreational purposes.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
NORTH RIVER BASIN
INVENTORY NO. MA 00192
BROWNS POND DAM
CITY OF PEABODY
ESSEX COUNTY, COMMONWEALTH OF MASSACHUSETTS

SECTION I - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of the dams within the New England Region. Tippetts-Abbett-McCarthy-Stratton has been retained by the New England Division to inspect and report on selected dams in the State of Massachusetts. Authorization and notice to proceed was issued to Tippetts-Abbett-McCarthy-Stratton under a letter of May 3, 1978, from Mr. Ralph T. Garver, Colonel, Corps of Engineers, Contract No. DACW33-78-C-0298 has been assigned by the Corps of Engineers for this work.

b. Purpose

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) Encourage and prepare the States to initiate quickly effective dam safety programs for non-Federal dams.

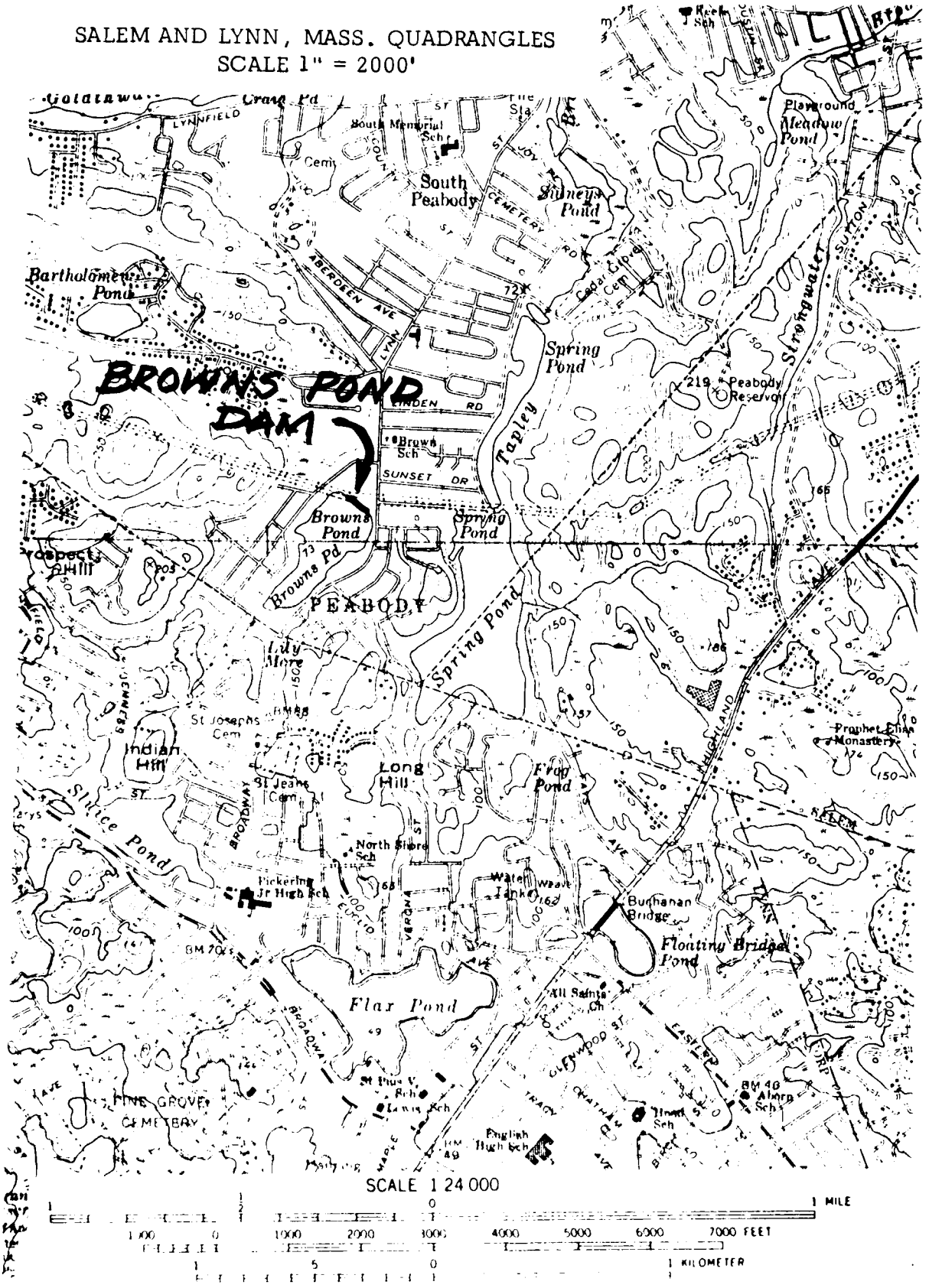
(3) To update, verify and complete the National Inventory of Dams.

1.2 DESCRIPTION OF THE PROJECT

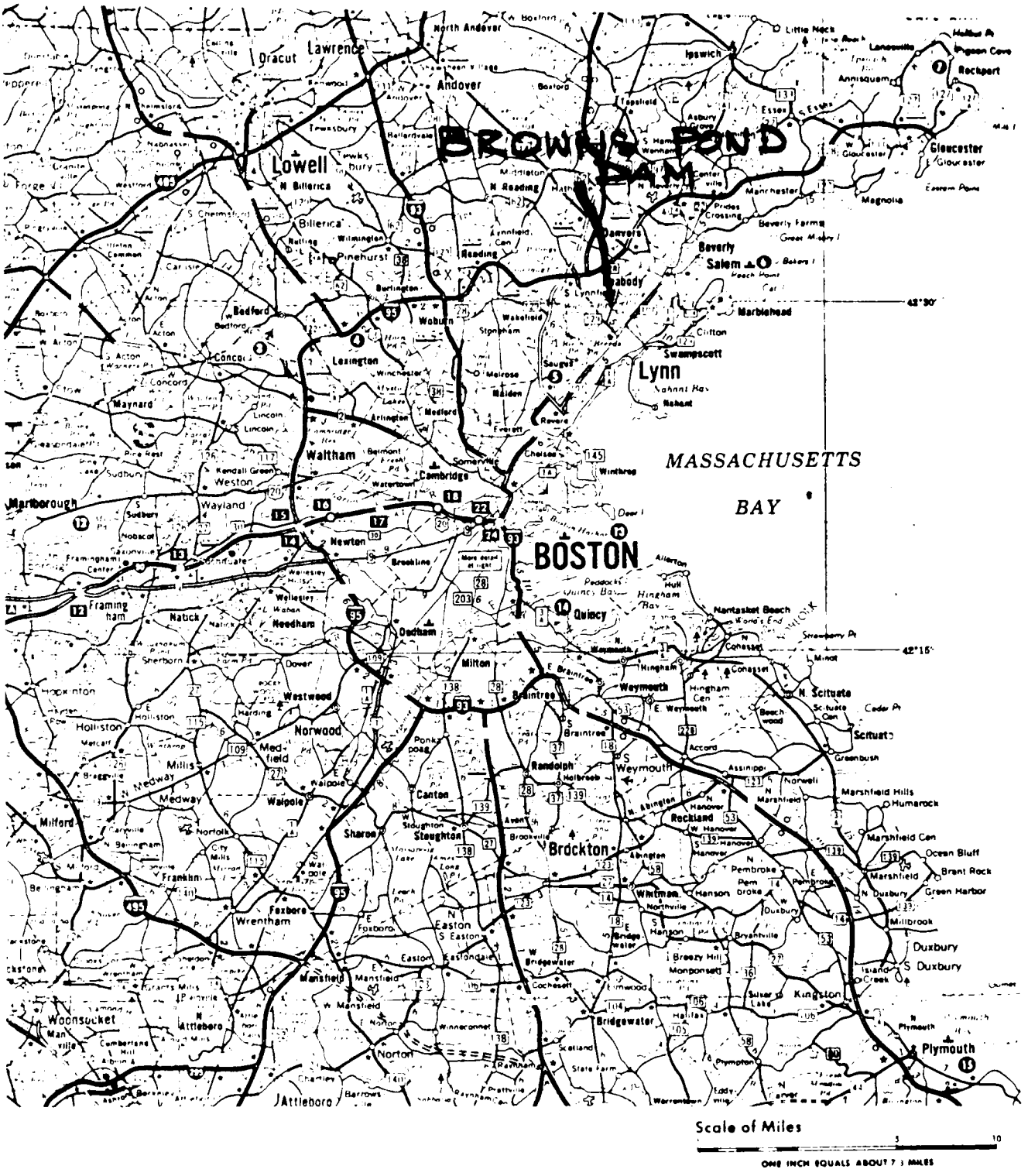
a. Description of Dam and Appurtenances

Browns Pond Dam is an earthfill embankment about 200 feet long

SALEM AND LYNN, MASS. QUADRANGLES
SCALE 1" = 2000'



TOPOGRAPHIC MAP
BROWNS POND OUTLET DAM



VICINITY MAP
BROWNS POND OUTLET DAM

Reach	Distance Below Dam (feet)	Flood Wave Elevation (feet)	Wave Depth (feet)	Discharge (cfs)
1	30	79	4.0	1500
2	2130	58.5	2.5	1171
3	3480	60.3	3.3	1061
4	5210	51.1	4.1	1000

Reaches 2 and 3 were taken across Fountain Pond and indicate raising of the pond surface of between 2.5 and 3.3 feet, respectively. The majority of flow between reaches 1 and 2 will probably be along Linden Road and Sunset Drive with shallow overland or sheet flow between the streets in the built up areas. Minimal property damage is expected with no loss of life, therefore, the hazard potential is classified as low. Since the dam is classified as small in size, with a low hazard potential, the test flood, in accordance with Corps of Engineers guidelines is the 50 to 100-year flood. The 100-year flood was selected as the Test Flood. The 100-year, 6-hour point rainfall for Peabody, Mass. is 4.75 inches.[3/] The distribution of the 100-year storm was based on data in a publication of the World Meteorological Organization.[4/] It was assumed that (a) there were no losses, (b) the reservoir at the start of the storm was at El 77.6, equivalent to the invert elevation of the spillway outlet pipe and there were no flashboards in use, and (c) that the spillway and outlet structure pipe outlets were blocked. A triangular unit hydrograph was developed to represent runoff from the land area and subsequently used to compute the flood hydrograph. The runoff from 4.75 inches of rainfall on the lake surface was added to the runoff from the watershed area to form the test flood inflow hydrograph and resulted in a peak discharge of 771.5 cfs (1056.9 csm).

The computed discharge capacity of the Browns Pond spillway, with the water level at El 81.25, equivalent to the bottom of the spillway cover, is 67.0 cfs (91.8 csm). The available surcharge storage between spillway invert El 77.6 and El 81.25 is estimated to be 179.0 acre-feet which is equivalent to about 4.5 inches of runoff over the entire basin.

The Test Flood was routed through the reservoir using a computerized routing technique and resulted in a maximum pond level of El 81.2 or about 0.9 feet below the top of the dam, with a corresponding outflow discharge of 63.3 cfs. The Test Flood peak outflow discharge is 94% of the maximum spillway capacity. Therefore, the spillway is considered adequate from a hydrologic and hydraulic standpoint.

References

1/ "National Program of Inspection of Dams", Department of the Army, Office of the Chief Engineers, Washington, D.C. 20314, May 1975.

2/ Recommended Guidelines for Safety Inspection of Dams, Appendix D, U.S. Corps of Engineers.

3/ Weather Bureau Technical Paper No. 40, 1961

4/ "Manual for Estimation of Probable Maximum Precipitation", World Meterological Organization, Operational Hydrology Report No. 1, 1973.

5/ "Design of Small Dams", U.S. Department of the Interior, Bureau of Reclamation, 1974.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Visual observations did not indicate any serious structural problems with the embankment, or the outlet works. The deficiencies described in Section 3 require attention and measures to improve these deficiencies are given in Section 7.

b. Design and Construction Data

No design computations or other data pertaining to the structural stability of dam have been located. On the basis of the past performance experience, the visual inspection, as well as engineering judgment, the dam at present appears to be structurally adequate.

c. Operating Records

There are no operating records kept or available. There are no records or reports of any operational problems, which would affect the stability of the dam.

d. Post-Construction Changes

The exact year the dam was built is unknown. It is reported by those interviewed that the dam was built about 1900. There are no records of any construction changes except those noted in the Essex County summarized inspection reports. For details see Section 2.2

e. Seismic Stability

The dam is located in Seismic Zone 3. There are no seismic records at the dam site. Because of the dam's configuration, condition and the head of water retained, a seismic analysis is considered not warranted.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition

Phase I investigation of Browns Pond Dam does not indicate conditions which would constitute an immediate hazard to human life or property. Based on engineering judgment and the performance of the earth embankment and outlet works, the project appears to be in good condition. The project, however, does have inadequacies and deficiencies which, if not remedied, have the potential for developing into hazardous conditions.

Because there are no data on Maximum Floods for such a small drainage basin it was necessary to synthesize a test flood hydrograph for the contributing area. Since the dam is classified as small in size, with a low hazard potential, the test flood, in accordance with Corps of Engineers guidelines is the 50 to 100-year flood. The 100-year flood was selected as the Test Flood. The 100-year, 6-hour point rainfall for Peabody, Mass. is 4.75 inches. The distribution of the 100-year storm was based on published data.

It was assumed that (a) there were no losses, (b) the reservoir at the start of the storm was at El 77.6, equivalent to the invert elevation of the spillway outlet pipe and there were no flashboards, and (c) both spillway and outlet structure pipe outlets were inoperative. A triangular unit hydrograph was developed to represent runoff from the land area and subsequently used to compute the flood hydrograph. The runoff from 4.75 inches of rainfall on the pond surface was added to the runoff from the watershed area to form the Test Flood inflow hydrograph and resulted in a peak discharge of 771.5 cfs (1056.9 csm).

The computed discharge capacity of the Browns Pond spillway, with the water level at El 81.25, equivalent to the bottom of the spillway cover, is 67.0 cfs (91.8 csm). The available surcharge storage between the spillway invert El 77.6 and El 81.25 is estimated to be 179.0 acre-feet which is equivalent to about 4.5 inches of runoff over the entire basin.

The Test Flood was routed through the reservoir using a computerized routing technique and resulted in a maximum pond level of El 81.2 or about 0.9 feet below the top of the dam, with a corresponding outflow discharge of 63.3 cfs. The Test Flood peak outflow discharge is 94% of the maximum spillway capacity. Therefore, the spillway is considered adequate from a hydrologic and hydraulic standpoint.

b. Adequacy of Information

The lack of in-depth engineering data did not allow fro a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history and sound engineering judgment.

c. Urgency

The remedial measures described in a subsequent paragraph should be undertaken by the owner within the next 24 months, after receipt of this Phase I Inspection Report.

d. Necessity for Additional Investigations

Additional investigations to assess the adequacy of the dam and appurtenant structures do not appear necessary.

7.2 RECOMMENDATIONS

None.

7.3 REMEDIAL MEASURES

a. Alternatives

None.

b. Operating and Maintenance Procedures

It is recommended that the following measures be undertaken by the owner within the next 24 months after receipt of this Phase I Inspection Report.

1. Establish a formal program of operation and maintenance, and initiate biennial inspections of the dam.

2. Provide round-the-clock surveillance during periods of unusually heavy precipitation.

3. Develop a formal system for warning downstream residents in case of emergency.

4. All vegetation on both slopes should be kept in a close cut condition.

5. All brush, shrubs and young saplings should be removed from the embankment and the area immediately downstream of the embankment toe. Large conifers, but not deciduous hardwoods, should be removed and the remaining trees should be inventoried

and their condition monitored. If a tree dies, the area around the tree should be closely monitored for seepage.

6. The gullies and sloughed areas of the upstream slope should be filled with suitable material and compacted.

7. Stone blocks at the entrance and exit of the spillway should be removed.

8. Remove debris from spillway approach channel.

9. Missing stones should be replaced along the spillway training walls and all joints should be repointed.

10. The extent of the spillway outlet pipe should be determined and the broken portion of the pipe repaired.

11. The gate valve which controls discharges through the outlet pipe should be maintained in operable condition.

VISUAL INSPECTION CHECKLIST

APPENDIX A

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT BROWNS POND DAM

DATE 11-16-78

TIME 2.30 PM

WEATHER Sunny 50°-55°F

W.S. ELEV. 73.1 * U.S.

PARTY:

1. Harvey S Feldman
2. Jyotindra H Patel
3.
4.
5.
6.
7.
8.
9.
10.

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	All project features inspected by party members		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

* Based on USGS Datum

PERIODIC INSPECTION CHECK LIST

PROJECT BROWNS POND DAM DATE 11-16-78

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

DAM EMBANKMENT

Crest Elevation 82.1

Current Pool Elevation 73.1 ±

Maximum Impoundment to Date —

Surface Cracks None

Pavement Condition No Pavement at crest

Movement or Settlement of Crest None (See misc. comments)

Lateral Movement None

Vertical Alignment Good

Horizontal Alignment Good

Condition at Abutment and at Concrete Structures Generally good at abutment

Indications of Movement of Structural Items on Slopes None

Trespassing on Slopes Both slopes shows evidence of trespassing

Sloughing or Erosion of Slopes or Abutments Several gullies at upstream slope See misc. comments

Rock Slope Protection - Riprap Failures Upstream slope riprap completely eroded

Unusual Movement or Cracking at or near Toes None

Unusual Embankment or Downstream Seepage None

Piping or Boils None

Foundation Drainage Features None

Toe Drains None

Instrumentation System There are none at Browns Pond Dam. However there is a Bench Mark at Spring Pond Dam and is based on USGS Datum

Miscellaneous: 1. Entire upstream slope between normal water level and edge of the crest shows erosion and sloughing. The riprap is completely eroded.

2. Downstream slope does not show any erosion or sloughing. The slope is completely covered with heavy vegetation including trees, saplings, bushes and overgrown grass. About 75 feet of the toe from the right abutment show erosion resulting from pedestrian traffic.

PERIODIC INSPECTION CHECK LIST

PROJECT BROWNS POND DAM DATE 11-16-78

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE

No Intake Channel. Intake structure is a trapezoidal concrete structure located at right abutment contact.

a. Approach Channel None

Slope Conditions _____

Bottom Conditions _____

Rock Slides or Falls _____

Log Boom _____

Debris _____

Condition of Concrete Lining _____

Drains or Weep Holes _____

b. Intake Structure

Condition of Concrete Generally good.

Stop Logs and Slots None.

Intake structure is open at top. Discharges can only be from the top.

PERIODIC INSPECTION CHECK LIST

PROJECT _____ DATE _____

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

OUTLET WORKS - CONTROL TOWER None

a. Concrete and Structural

General Condition _____

_____

Condition of Joints _____

_____

Spalling _____

_____

Visible Reinforcing _____

_____

Rusting or Staining of Concrete _____

_____

Any Seepage or Efflorescence _____

_____

Joint Alignment _____

_____

Unusual Seepage or Leaks in Gate Chamber _____

_____

Cracks _____

_____

Rusting or Corrosion of Steel _____

_____

b. Mechanical and Electrical

Air Vents _____

_____

Float Wells _____

_____

Crane Hoist _____

_____

Elevator _____

_____

Hydraulic System _____

_____

Service Gates _____

_____

Emergency Gates _____

_____

Lightning Protection System _____

_____

Emergency Power System _____

_____

Wiring and Lighting System _____

_____

PERIODIC INSPECTION CHECK LIST

PROJECT BROWNS POND DAM DATE 11-16-78

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

OUTLET WORKS - TRANSITION AND CONDUIT Intake structure outlet is 20" Cast iron pipe *

General Condition ~~of Concrete~~ Good

Rust or Staining of Concrete minor rusting

Spalling —

Erosion or Cavitation None where visible.

Cracking —

Alignment of Monoliths —

Alignment of Joints —

Numbering of Monoliths —

* Cast iron pipe which is underground about 200 feet and then transition to 24" vetrified clay pipe which runs 5000 feet underground before outfalling into Tapley Brook

D. // R. S.P.

COUNTY OF ESSEX, MASSACHUSETTS
ENGINEERING DEPARTMENT

Inspection of Dams, Reservoirs, and Stand Pipes

0125-5C
SUB NUMBER
D. // R. S.
Neg. Nos. 136

Inspector E. E. Barbon Date April 9, 1912 *Classification 3

City or Town Peabody Location Northerly end of Brown Pond westerly side of Lynn St.

Owner Peabody Water Works Use Water Supply

Include such details as cores, cut off walls, paving, sodding, class of masonry, kind of cement, (nat. or port.) etc.

Material and Type Earth. Stone (large & small) paving on upper side Sodded on lower side

Elevations in feet: above (+) or below (−) full pond or reservoir level. (Cross out what does not apply.)

For Dam
Bed of stream below −5 Bottom of pond −5 Bottom of spillway −5 Top of dam +2 Top of flash boards +1

For Res or S. P.
~~Ground surface below~~ ~~Bottom of res.~~ ~~Level of over flow~~ pipe ~~Top of res.~~ 06-Jun 7:30 P.M.

For dam
Length in ft. 200 Top width in ft. 12 Pond area 27.7 acres Area of watershed 288 acres

For Res or S. P.
~~Inside dimensions~~ ~~Capacity~~ 46 000 000 gal ~~covered~~ ~~open.~~

Length of overflow or spillway 6 ft 0 Outlet pipes (size and nature)

~~Stand pipe, thickness at base~~ ~~diam. of rivet head~~ ~~Pitch~~ hor. ver.

Foundation and details of construction

Constructed by and date

Recent repairs and date

Evidence of leakage None

Condition Poor S. P. when painted inside ~~out~~

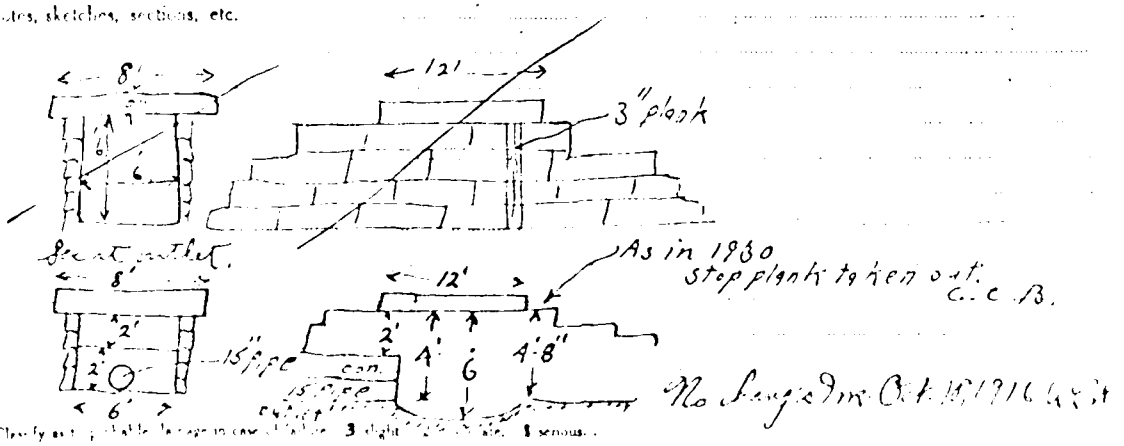
Topography of country below Open flat country

Nature, extent, proximity, etc. of buildings, roads or other property in danger if failure should occur None

Plans and data secured or available

Use separate sheet for sketches if necessary.

Notes, sketches, sections, etc.



*Classify as 1 probable danger in case of failure 2 slight 3 none 4 serious.

Peabody Square, so that in case of the rare storm which we are considering, the whole vicinity of the stream where it flows through the city of Peabody would be badly flooded even if the dams remain intact and this area consists in part of manufacturing establishments and a considerable business section as well as residences.

Regardless of such a flood condition, however it cannot be assumed that a breaking of one or more dams at such a time would not cause some further loss or damage such as it contemplated by the law requiring inspection of dams.

15

Robert R. Ervin

should be adopted which would make it impossible to raise and hold the water level so high that the freeboard would be less than about three to four feet or if extra storage capacity is considered essential, the top of the dam should be raised.

Fountain Pond Dam is probably sufficient under any conditions to be reasonably expected if the water level be kept a few feet below the top of the dam and if the gate be opened promptly when necessary and all stop plank removed. It would be a comparatively simple matter to pave or riprap the lower face of this dam so that it would safely withstand an overflow along its whole length and this would be a far more adequate protection as there are now too many chances that some one will fail to take proper measures at the proper time to avert trouble.

The Sidney's Pond Dam below Fountain Pond is only partially in use and through an agreement with the proprietors of the cemetery above, only four feet of water is maintained in it. It has apparently been many years since the water has been raised much higher than this and nothing is known as to the tightness of this dam under such conditions of high water. Assuming that it would safely withstand filling to the top of the dam, it might provide through the present spillway a sufficient outlet under all circumstances but there is considerable uncertainty, and a larger outlet, at least above the normal level of the water, might well be provided.

The Danvers Bleachery Dam just below the junction of the two streams was built within a comparatively few years and is apparently well built and in good condition but the capacity of the spillway as built is less than one half of the flow which I believe might reasonably be expected under extreme conditions. It could be improved to a considerable extent by removing the wall at the lower end of the outlet chamber which has an opening in it of rather restricted area through which the water must flow, but even then in order to safely discharge the required amount through the spillway it would be necessary to raise the top of the dam at least three or four feet or to lengthen the spillway.

The other dams on these streams I believe, are unimportant from the standpoint of safety and those in use are generally in good condition and reasonably safe for the condition.

These conclusions are not in most respects materially different from what has been stated in previous reports but they are based on a much more thorough investigation than any which had been made up to this time, and I wish again to emphasize the fact which has been stated in previous reports that there are other conditions which might result in damage along this stream, which do not depend upon the safety of these dams, or the sufficiency of their spillways, and the flooding of the stream valley below would not be prevented by the changes here recommended.

I believe that even the spillway of the Danvers Bleachery dam will now probably discharge as much water as can flow through the stream below it, which passes through nine culverts before it reaches

Copy
Report to Co. Comm

Dec. 11, 1933

PEABODY

At the time of my report to you in 1932 upon the condition of the dams in the southeast part of the County including those in the city of Peabody, the dams on Goldthwaite Brook and Tapley Brook in that city had been inspected and were included in the table accompanying the report, but surveys were then being made to secure data for further study and it was stated that a separate report on these structures would be made as soon as possible.

These surveys were completed early in the present year and taking advantage of such opportunities as have presented themselves, we have made observations of the effect of various storms on the level of the ponds and the run-off from these watersheds to determine whether conditions here are materially different from what would ordinarily be expected. There have been several storms with heavy rainfall during the year but nothing more than what is to be reasonably expected every few years.

Under such conditions as we have observed the flow in the main stream is low for the area of watershed tributary to it, due to the storage capacity of the ponds and swamps on the watersheds above.

Two of the ponds on the watershed of Tapley's Brook which is the south branch of the main stream are used as a source of water supply, and since the city of Peabody is faced with a shortage of water it follows that these ponds are usually drawn down well below their highwater levels so that at such times they will retain the runoff from a farily heavy storm without overflowing, and on the Goldthwaite Brook watershed, there is a large area at the upper end around Cedar Pond which is flat and swampy so that the whole area ordinarily contributes very slowly to the flow of the stream below.

It is evident, however, that this storage effect prevails only in the storms of not unusual severity and in the event of an extremely heavy rainfall such as occurs on an average of not more than once in fifty or one hundred years at the same locality, these beneficial effects of storage would be lost when all ponds and swamps were filled. Without doubt the main stream would then have a maximum discharge far in excess of what we have observed, as although the rainfall might be only three or four times as great as what we have observed, the flow would be many more times as great because with all storage capacity absorbed the entire watershed would be contributing its runoff.

We have twice observed that Spring Pond was full substantially to the top of the dam and apparently was purposely held at that level, so that it is plain that the fact of heavy draft on these ponds for a water supply cannot be relied upon as a protection.

In order to put all these dams in condition such that no failure would reasonably be expected even in the event of the storm of rare frequency above assumed, some method of control of Spring Pond

this slight damage is to be avoided, the outlet at Lake Street should be improved and possibly the street should be raised and at the dam owned by J. F. Cobb the construction at the ends of the dam could well be improved.

BPE

damage due to anything which might be classed as a failure of the dam. The abandoned dam owned by the Danvers Bleachery Company on Goldthwait Brook further down the brook does not now hold back any water. The dam belonging to the Danvers Bleachery Company on Goldthwait Brook still further down the stream seems to be in good condition and has fairly ample provisions for storm water if stop plank were removed promptly, and there is flat open country quite extensive in area below the dam. Below the last dam above mentioned is a small affair east of Allen's Lane owned by the Essex Gelatine Company, which could not do any damage through failure, and still further down is another structure, equally unimportant.

On the whole, I do not feel that any of these dams on Goldthwait Brook and Tapley Brook require any immediate action. The only possibility which occurs to me is, that in a very excessivly heavy storm, starting at the upper end of each brook, partial failures each adding its cumulative effect might produce a condition in the lower portions of the stream as it approaches the main street in Peabody which would cause damage there, and I have not enough data at hand to feel sure that even in this event there is likelihood that such damage would be due even in major part to the possible failure of the structures rather than to the capacity or lack of capacity of the brook in its lower stretches. I gave no notice to any of the agents of the industrial plants above mentioned before inspecting the dams. The dam on Lake Street at the end of Devils Dishfull Pond near the B. & M.R.R. is in rather uncertain condition and it is easily believable that it may overflow and possibly cut away a channel which would drain the pond down to some extent, but there seems to be no opportunity for serious damage below at least until the small ponds at Phelps Mill are reached, and here the upper dam is hardly more than a causeway through the pond while the lower dam, although not very substantial, holds the water at a level so little above the road, a few hundred feet below, that it is hard to believe that there would be any serious damage there or in the extensive low swampy land beyond the road. However, if even

0120-5C

0125-5-C

DAMS IN PEABODY - INSPECTED NOVEMBER 22, 1928.

With Mr. P. H. Woshier, City Engineer of Peabody, visited Browns Pond Dam, Spring Pond Dam, and Fountain Pond Dam and found conditions substantially as stated in Mr. Barker's report. The structure at Brown's Pond should hardly be classed as a dam since the pond is so little above the surrounding country and except for such water as could escape down the ditch, there could be nothing but a broad sheet of shallow water flowing from the pond in any case. At Spring Pond, with all outlets open, the run-off, even from excessive storms, would probably be taken care of and under present conditions the water would overflow the land west of the dam in a broad shallow stream through flat country before it reached the top of the dam. The dam itself would stand some overtopping and there seems to be no reason to expect a sudden failure even under extreme conditions which could occur. The overflow would find its way to the pond immediately below, Fountain Pond, and the dam at the north end of that pond has an apparently substantial masonry wall on the down stream face which should, in an emergency, stand up even if overtopped for its full length to some considerable depth. The land in the cemetery just east of the dam is slightly lower than the top of the dam and there is some possibility that the water might find its way around here and do some damage to the cemetery though apparently not very serious. With all flash boards removed from the outlet through this dam, and with the gate open, provisions for discharge of flood waters are fairly liberal. The conditions at both of these ponds last mentioned would be considerably improved by providing more adequate spillways, but the likelihood of any serious failure seems remote enough in view of the flat open country for some distance below the lower dam, so that it is doubtful whether more ample provisions should be insisted upon.

On the same day as above, I looked at other dams in Peabody as follows: The dam belonging to the Tanners Products Company on Goldthwait Brook north of Lynnfield Street, where it would seem that, although there are possibilities of flooding the buildings from overflow, there is no possibility of

COUNTY OF ESSEX

OFFICE OF COUNTY ENGINEER
COURT HOUSE, SALEM, MASS. 01970

JAMES R. CARLIN, P.E.
COUNTY ENGINEER

MAURICE T. DENCH, P.E.
F. RICHARD GELOTTI
ASS'T. ENGINEERS

744-1240 Ext. 14

September 18, 1978

Jyoti Patel
T.A.M.S.
345 Park Ave.
New York, New York 10022

Dear Sir:

We have quite a bit of information on the Spring Pond Dam and Browns Pond Dam in Peabody, including periodic report sheets.

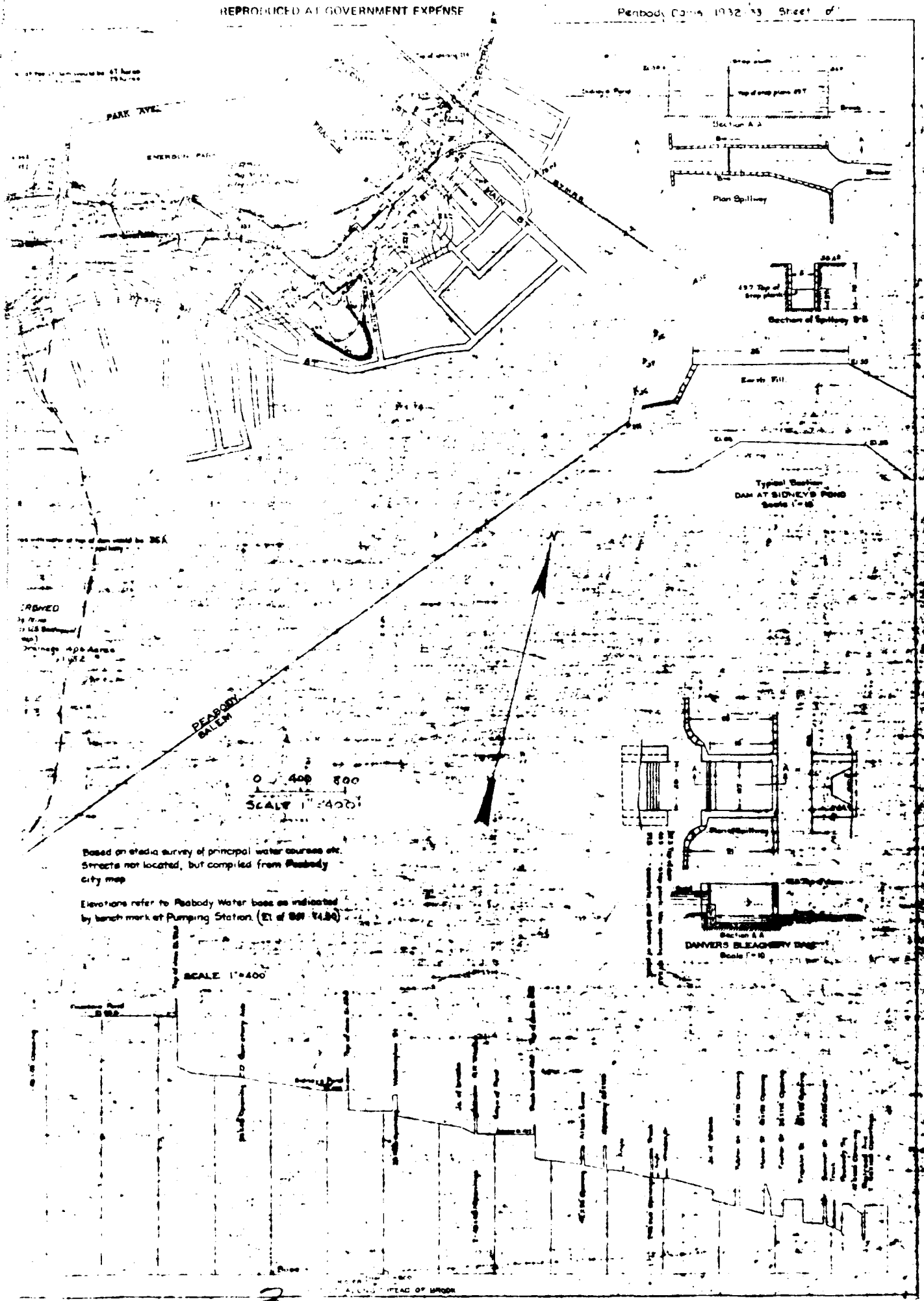
I suggest you come to the office and look over this information if you think any of it would be of any value to you.

Very truly yours,

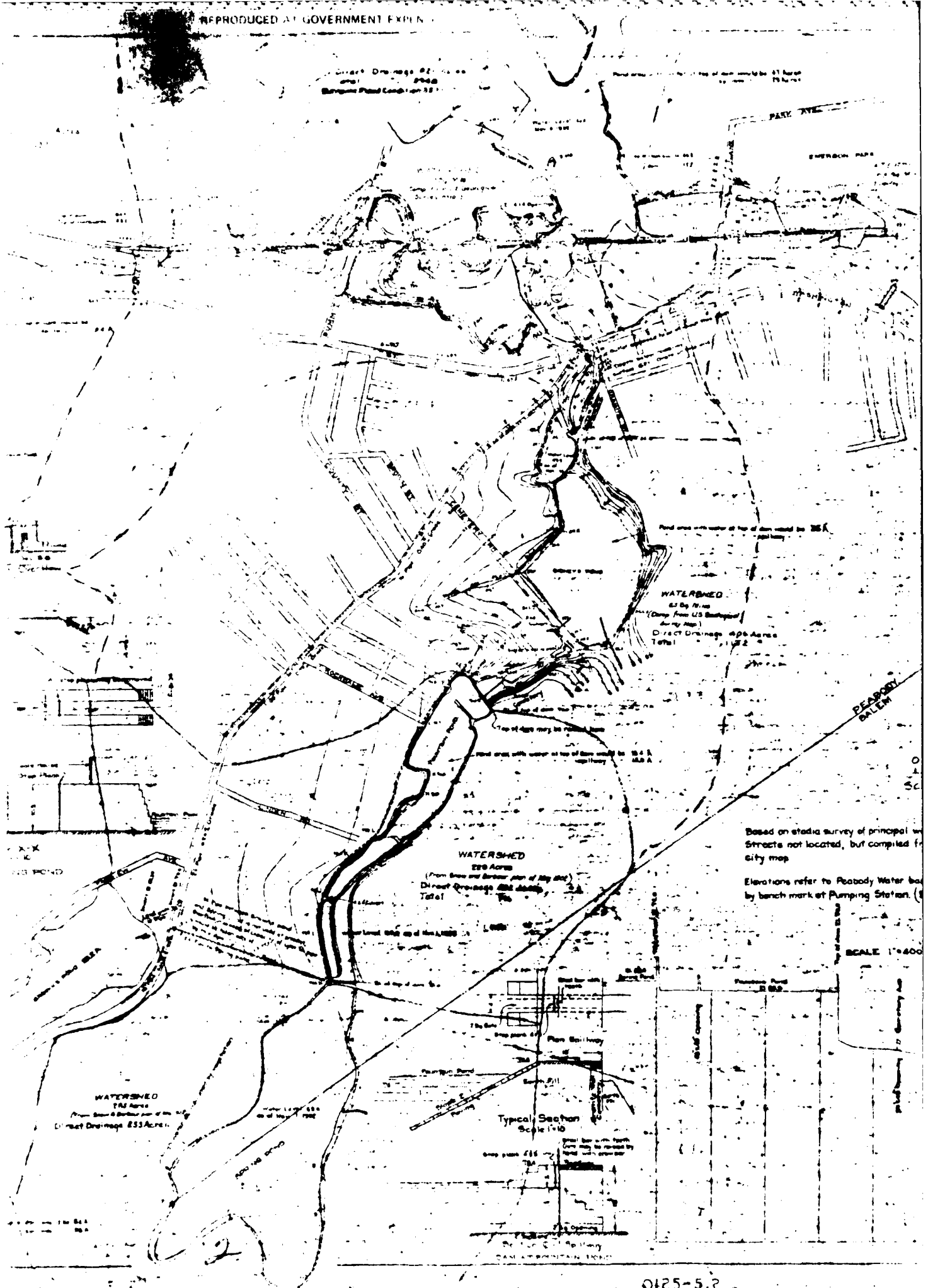
James R. Carlin

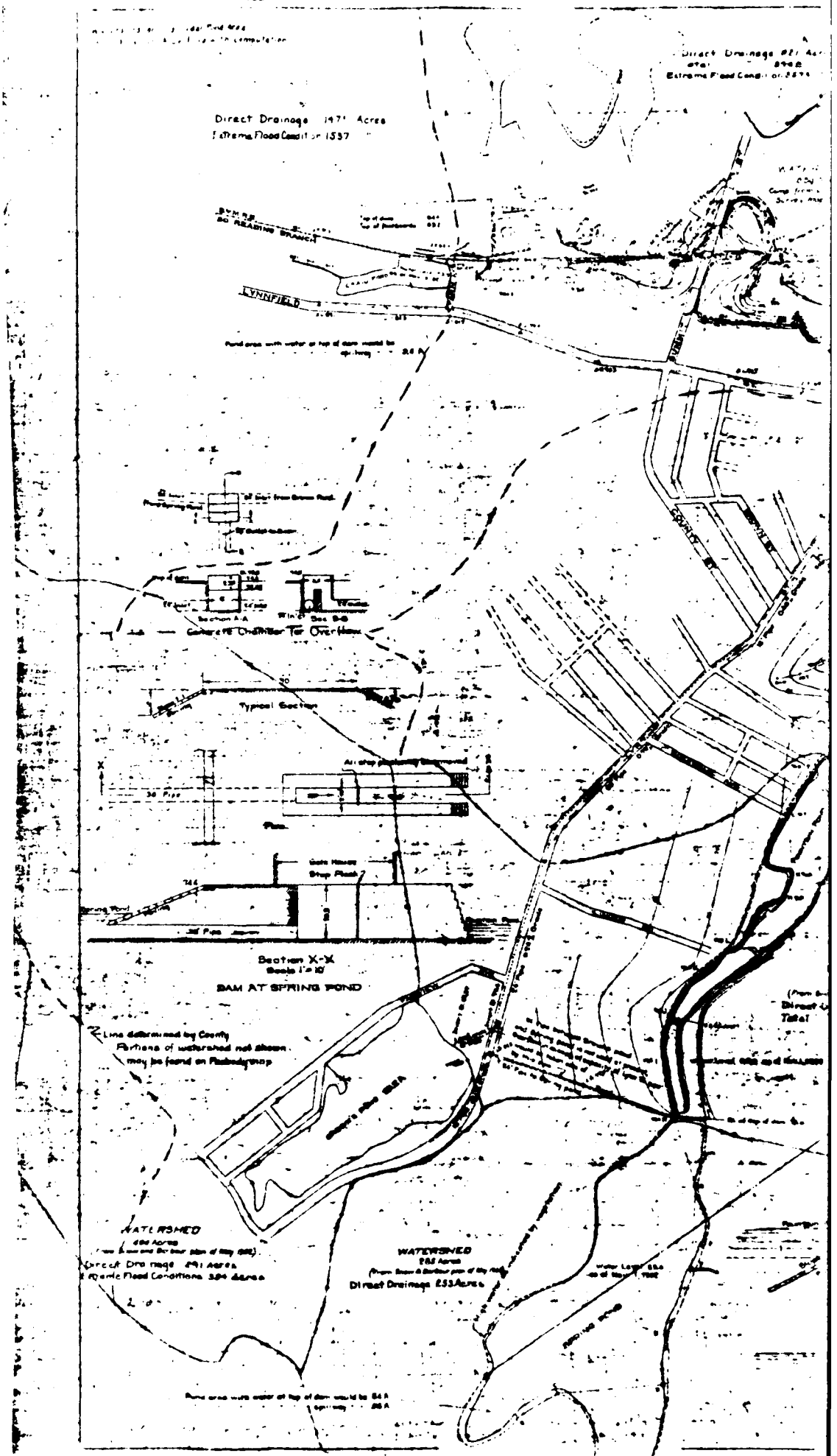
JAMES R. CARLIN
County Engineer

JC/fn



Plan





DRAWINGS AND INSPECTION REPORTS

APPENDIX B

Floor of Channel Natural bed.

Other Obstructions Stone blocks and misc. debris; about 250 feet downstream there is hyon Stuck embankment

Miscellaneaceous 1. The upstream training walls upper courses stone blocks are fallen into the approach channel. At several locations mortar is loose and missing

2. The downstream training walls with few blocks from the upper courses have fallen into the channel. At several locations mortar is loose and missing

3. Outlet pipe which is Vetrified clay is about 14 inches and is in fair condition with a 5 foot section broken.

PERIODIC INSPECTION CHECK LIST

PROJECT BROWNS POND DAM DATE 11-16-78

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS

Stone masonry and Concrete Spillway consist of overflow concrete headwall and an outlet pipe.

a. Approach Channel

General Condition Poor.

Loose Rock Overhanging Channel None

Trees Overhanging Channel None

Floor of Approach Channel IS Silted; blocked by minor debris and Stone blocks.

b. Weir and Training Walls Weir is of concrete and walls are Stone and of Stone Masonry

General Condition of Concrete Weir is in good condition and upstream and downstream training walls in poor & fair condition (See Misc. comment)

Rust or Staining None

Spalling None at Headwall.

Any Visible Reinforcing None

Any Seepage or Efflorescence None

Drain Holes None

c. Discharge Channel

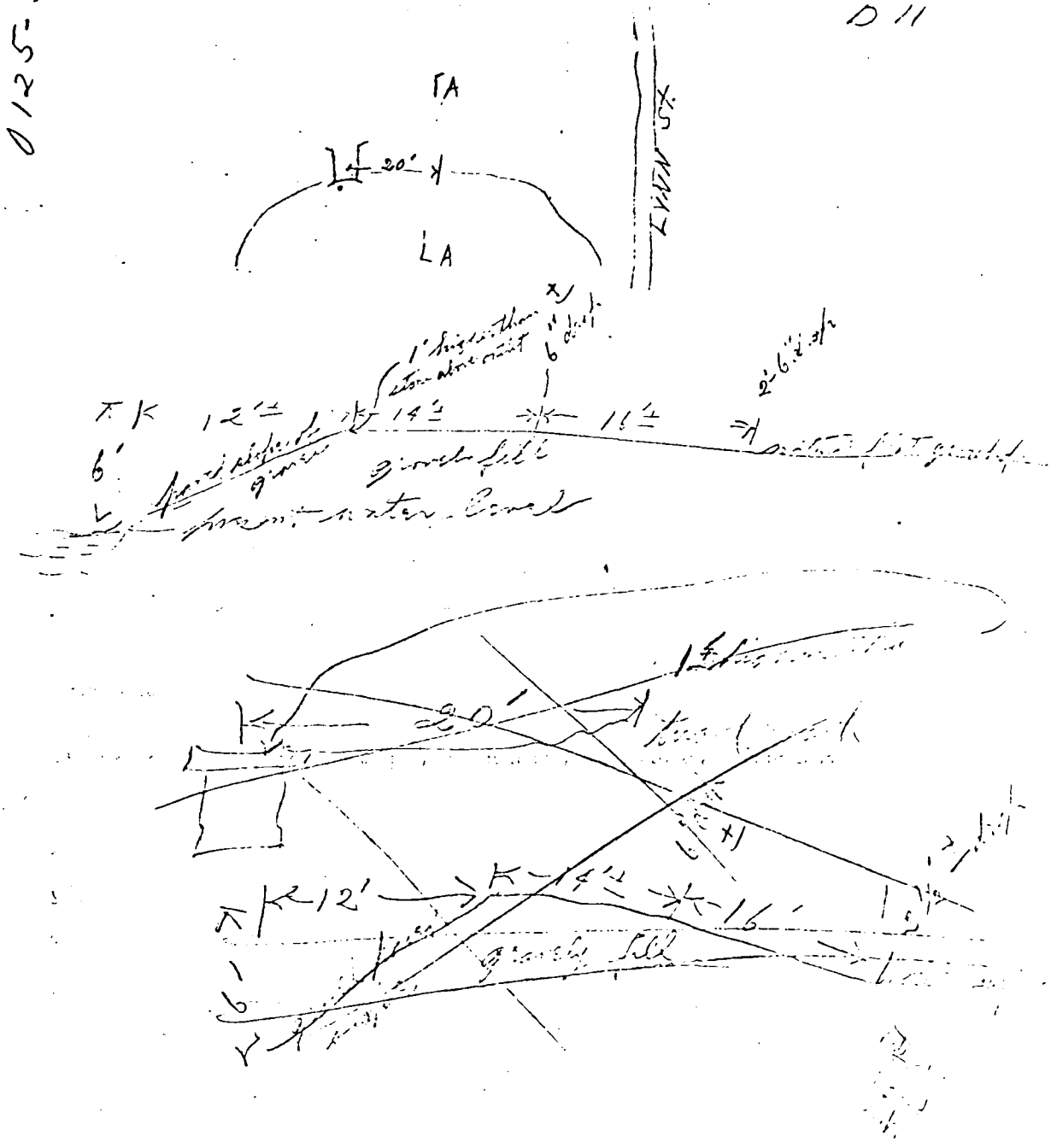
General Condition fair

Loose Rock Overhanging Channel None

Trees Overhanging Channel None

0125-5-C

0125-5-
D 11



Peabody D. 11

1917, March 26. Watershed 0.4 sq. m. Max. Ht. 7.0 ft. Apparent condition, Fair.

1923, Nov. 26. R. R. Evans, Insp. Peabody Water Works, Brown's Pond Dam. Dam is in good condition but its safety depends entirely on the height at which the flash boards are maintained. It would be possible to raise these to such a point about 12" below top of dam, that there would be practically no overflow capacity and the dam might be over topped. It is a low structure draining into the pond at the Pumping Station.

With 288 acres watershed and 27.7 acres pond surface, a rainfall of 6" in 24 hours might raise pond level some 4 ft. disregarding increase of area and about a third of this rise would perhaps be permissible so that some 50 c.f.s. must be wasted which might easily be accomplished by removing the top plank.

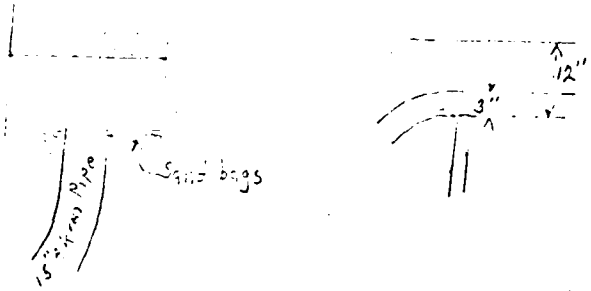
1923 Report to Co. Comm. See D. 12 - 1923 Report.

1928, July 25. C. C. Barker, Insp. Dam at the northerly end of Brown Pond west of Lynn Street, isowned by the Peabody Water Works. Peabody has not used the water since the first of the year, and has opened the pond to boating, swimming, etc. I gave Mr. Mosher, City Engineer, notice of inspection. It did not seem necessary to have anyone accompany me to the dam. The country below the dam is open and flat. In case of failure the damage would be slight and it is not likely there would be any loss of life. There has been no change since the last inspection and the conditions are the same. The dam is in fair condition. The water level today is 1' 6" below the top of the dam.

1928, Nov. 22. R. R. Evans, Insp. notes of Dams in Peabody which see.

1928 Report to Co. Comm. There are three dams in the city of Peabody which form a part of the water supply and are owned by the city. One of these at Browns Pond is in good condition and is of very little importance, as no material damage is possible.

1929, April 23. 2:15 P. M. C. C. Barker, Insp. Brown's Pond Dam. Today 3" of water is flowing over the top of flash board which is one ft. below top of dam. A 15" pipe has been laid from the spillway to a drain in the highway. Evidently the 15" pipe would not take all the water as it has washed around the sandbags and around the pipe and some water is flowing under the culvert in the road into the field below which drains to Spring Pond. The pond has not overflowed the top of the dam.



Peabody D. 11

1930, Sept. 11. C. C. Barker, Insp. Dam at the northerly end of Brown Pond west of Lynn Street, is owned by the Peabody Water Works. I gave a copy of the notice to City Engineer R. W. MacDonald. He did not send anyone to the dam with me. The pond is used for pleasure and not for drinking water. The country below is flat and in case of failure the damage would be slight. All the stop plank ~~pipe~~ are removed from the outlet. The lower side of the outlet is filled with a block of concrete 2 feet deep around a 15 inch pipe to take overflow of pond. The clear opening left in the culvert is 2 feet deep and 6 feet wide. Mr. MacDonald had all the stop plank taken out to keep pond level down and prevent wash around the ice houses, and also prevent overflow into Spring Pond. The water level is 6 feet below top of dam today. The dam is in good condition.

1930 Report to Co. Comm. The dam at Brown's Pond west of Lynn St. forms a part of the Peabody water supply system, but is not now so used. In its present condition there is nothing about the structure which could cause any serious damage through failure.

1932, July 29. C. C. Barker, Insp. The condition is the same. There has been no change.

1933, See Report to Co. Comm.

1934, Sept. 26, C. C. Barker, Insp. The dam is in good condition There is a 20 inch pipe leading out of the pond between the roadway and the spillway. The water level is about 6 feet below the top of the dam and just running into this pipe. There is a drain that leads direct from this pond to below Fountain Pond at the Pumping Station.

1934 Report to Co. Comm. See D. 5 (?)

1936 August 4, C.C.Barker, Insp. This dam is in good condition there has been no change since the last inspection. The water level is about 6 ft. below the top of the dam.

1936 Report to Co. Comm. See D. 5

1938 October 19, C.C.Barker, Insp. This dam is in good condition. There has been no change. The water level is 5.5 feet below the top of the dam.

1938 Report to Co. Comm. Safe and in reasonably good condition.

1940 Sept. 27, C.C.Barker, Insp. This dam is in good condition except that there are bushes along the overflow and the 20 inch outlet pipe is somewhat closed by fallen stones. The water level is about 5.5 feet below the top of the dam. The ice houses are gone.

1940 Report to Co. Comm. Safe and in reasonably good condition.

Peabody D. 11

1942 July 23, C.C.Barker, Insp. The condition here is the same as when last inspected. There has not been any change. The water level is about 6 feet below the top of the dam.

1942 Report to Co. Comm. Safe and in reasonably good condition.

1944 July 6, S.W.Woodbury, Insp. The water level is about 4 1/2" above the flow line of the 20" C.I. pipe about 150 ft. south of the masonry culvert. There does not appear to have been any change here.

1944 Report to Co. Comm. Safe and in reasonably good condition.

1946 Aug. 5, S.W.Woodbury, Insp. I gave a copy of the notice to Mr. Harte for Mr. McCarthy and Mr. Harte went to the dam with me. Water level today is about 4" below top of outlet pipe. 1.9' below top of opening of culvert at Fairview Avenue. Condition of the dam is the same.

1946 Report to Co. Comm. Safe and in reasonably good condition.

1948 Sept. 15, S. W. Woodbury, Insp. Gave a copy of the notice to Mr. Thomas Harte for Mr. McCarthy and went to dam alone. Water level today: 3.5' below top of opening at culvert at Fairview Avenue. Condition of the dam is the same.

1948 Report to Co. Comm. Safe and in reasonably good condition.

1950 Sept. 18, S.W.Woodbury, Insp. Gave a copy of the notice to Mr. John Manning for Mr. McCarthy and went to dam alone. Water level today: About 3.5' below top of opening at Fairview Avenue or 6" below flow line of 20" C.I. pipe at Lynn St. Condition of the dam: Same. No screen over 20" C.I. outlet pipe at Lynn St.

1950 Report to Co. Comm. Safe and in reasonably good condition.

1952 Sept. 30, E.H.Page, Insp. Left a copy of the notice at the office of Com. of Public Works and went to dam with Mr. Driscoll from the pumping station. No repairs since last inspection. Water level today: 0.2 below 20" pipe under Lynn St. 3.1 below conc. spillway at Fairview Ave., Condition of the dam is the same.

1952 Report to Co. Comm. Safe and in reasonably good condition.

1954, June 2, E.H.Page, Insp. Elev. of water: 1'-6" below top of flashboards. Height of flashboards 3'-3" Water is overtop of culvert headwall at Fairview Avenue.

1954 Report to Co. Comm. At Brown's Pond, west of Lynn Street, the water was over the top of the culvert headwall at Fairview Avenue at the time of the inspection.

1956. Sept. 7, E.H.Page, Insp. Elev. of water: Outlet completely out of water. About 4' ± below top of flashboards. Height of flashboards: 3'-3" steel plate Obstructions in spillway: Granite blocks.

1956 Report to Co. Comm. At Brown's Pond, west of Lynn Street, there are some granite blocks in the spillway.

1959, Jan. 5, E.H.Page & K.M.Jackson, Insp. Condition: same.

1958 Report to Co. Comm. At Brown's Pond, west of Lynn Street, there are some granite blocks in the spillway. These should be removed.

1961, January 5, E.H.Page & P.D.Killam, Insps. Condition: Same.

1960 Report to Co. Comm. At Brown's Pond, west of Lynn Street, there are some granite blocks in the spillway. These should be removed.

1962, Dec. 28, K.M.Jackson, Insp. Owner: City of Peabody (Water Works) No repairs. Conditions below dam: Same. Height of flashboards: 2'-6" steel plate. Obstructions: Debris and granite block. Condition: Same. Debris inside and outside spillway should be removed. Frozen over. Skating.

1962 Report to Co. Comm. At Brown's Pond, west of Lynn Street, there are some granite blocks and debris that should be removed from inside and outside the spillway.

1964 March 8, 1965. P.D.K. & K.M.J. Insps. Condition same as 1962. Debris inside and outside spillway should be removed.

1964 Report to Co. Comm. There are some granite blocks and debris that should be removed from inside and outside the spillway.

1966 March 4, 1967. P.D.K. & K.M.J. Insps. Condition same as 1964 report.

1966 Report to Co. Comm. Safe and in reasonably good condition.

1968 Feb. 6, 1969. P.D.Killam. The pond was frozen over. No water over the spillway.

D. 11

2 PEABODY
5-5-229-11

L.E. WILKINSON 11/30/71 3

WEST OF LYNN ST. 0.10 MI. SOUTH OF FAIRVIEW AVE.
OUTLET OF BROWN'S POND.

CITY OF PEABODY

WATER SUPPLY

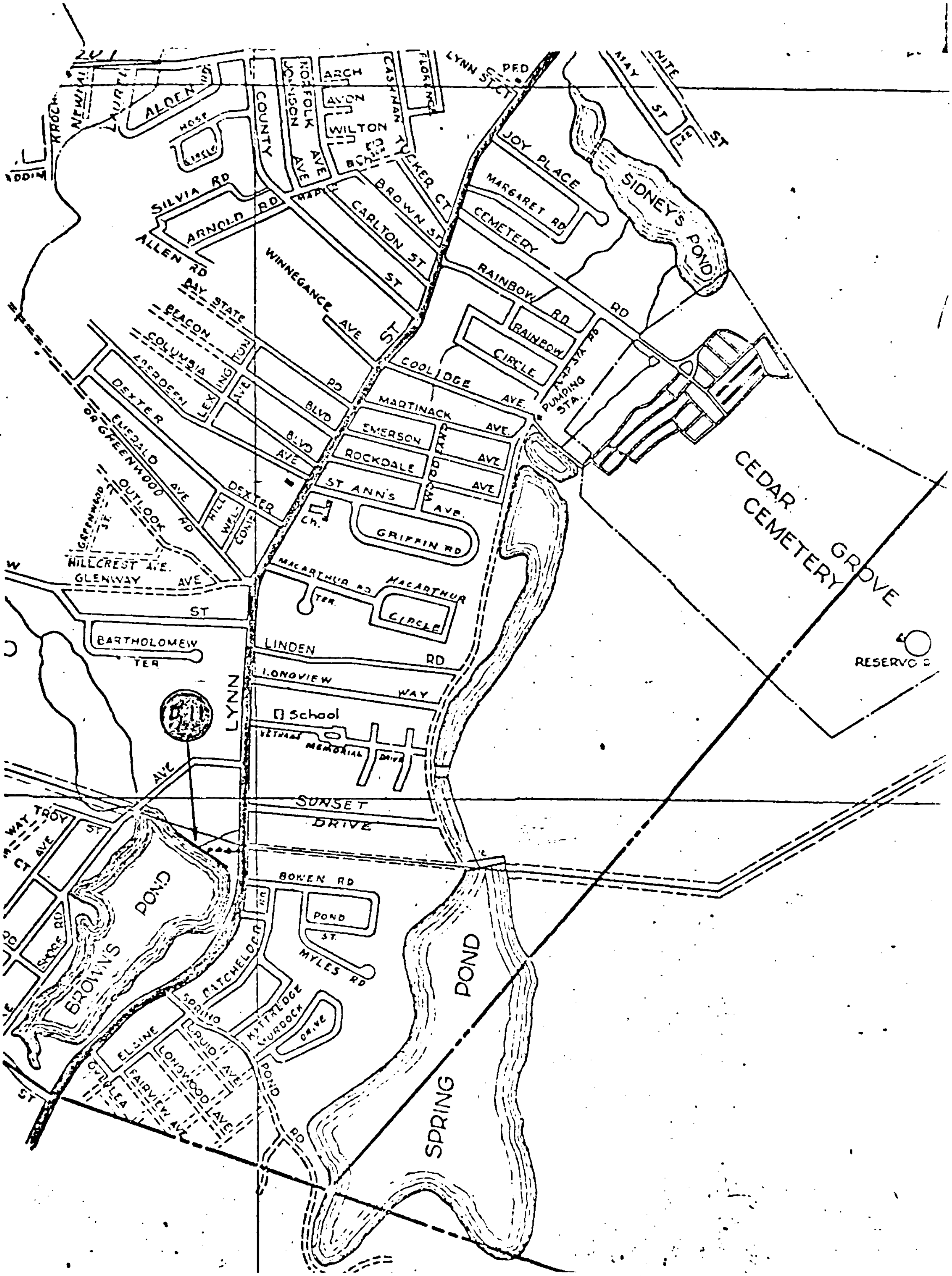
EARTH AND ROCKS

7.0± FT.

200.0± FT. 12.0± FT.

WATER LEVEL IN POND 6.0± FEET BELOW TOP OF DAM - 15" OUTLET PIPE UNDER SPILLWAY SEEMS TO KEEP WATER LEVEL DOWN. — THIS POND IN A NATURAL SHALLOW BASIN.

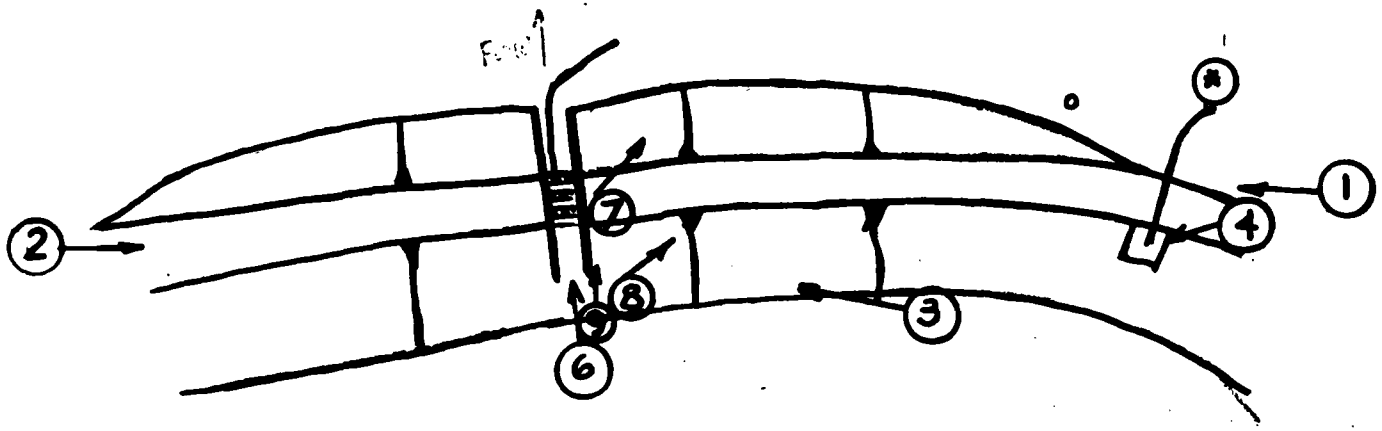
THIS STRUCTURE DOES NOT APPEAR TO REQUIRE INSPECTION UNDER CHAPTER 595.



LYNN ST
COUNTY
NORFOLK AVE
JOHNSON AVE
ARCH
AVON
WILTON
CASHMAN
ALDEN
TUCKER CT
BROWN ST
CARLTON ST
WINNEGANCE AVE
ST
JOY PLACE
MARGARET RD
CEMETERY
SIDNEY'S POND
RAINBOW RD
RAINBOW CIRCLE
COOLIDGE AVE.
PUMPING STA.
MARTINACK AVE.
EMERSON AVE
ROCKDALE AVE
ST ANN'S AVE.
Ch.
GRIFFIN RD
SILVIA RD
ARNOLD RD
ALLEN RD
BAY STATE RD
BEACON BLVD
COLUMBIA BLVD
ABERDEEN AVE
LEXINGTON AVE
DEXTER
EMERALD AVE
OR GREENWOOD
OUTLOOK RD
HILLCREST AVE.
GLENWAY AVE
ST
BARTHOLOMEW TER
MACARTHUR RD
MACARTHUR CIRCLE
TER.
LINDEN RD
LONGVIEW WAY
School
VETERANS MEMORIAL DRIVE
LYNN
SUNSET DRIVE
CEDAR GROVE CEMETERY
RESERVO
TROY ST
AVE
BOWEN RD
POND ST
MYLES RD
BROWN'S POND
SHORE RD
BATCHELDER
SPRING
ELAINE
DRUID AVE
LONGWOOD AVE
FAIRVIEW AVE
MURDOCK DRIVE
POND RD
SPRING POND
ST

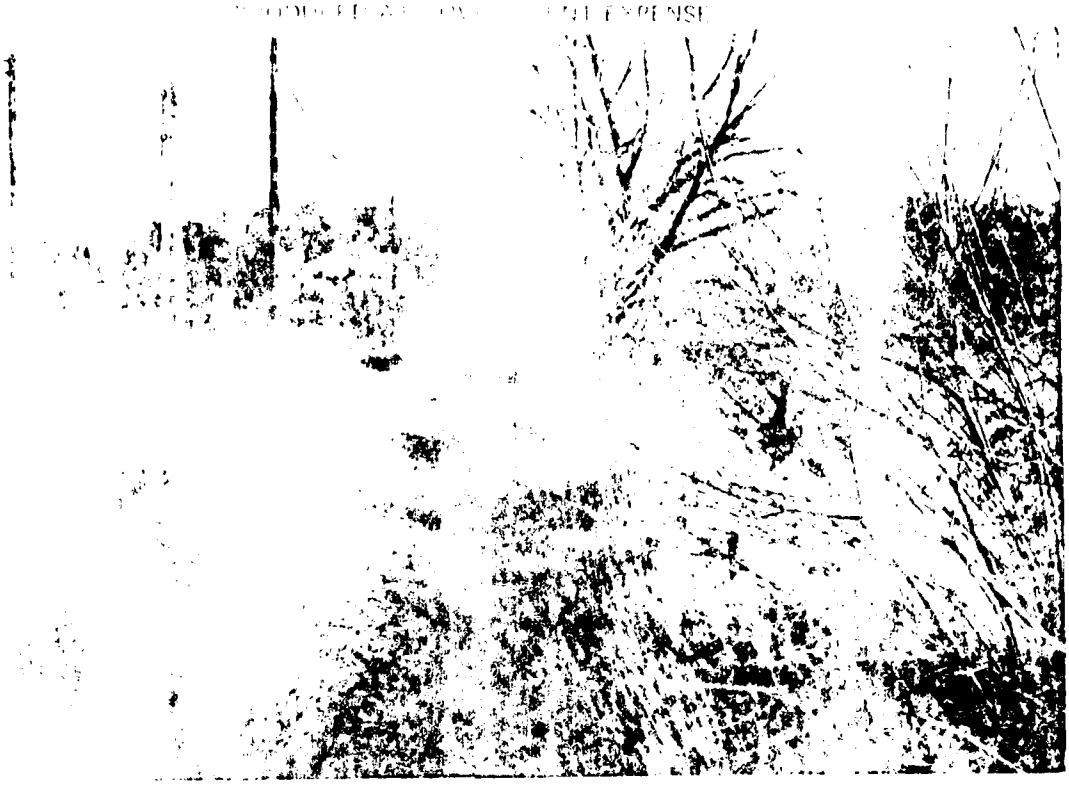
PHOTOGRAPHS

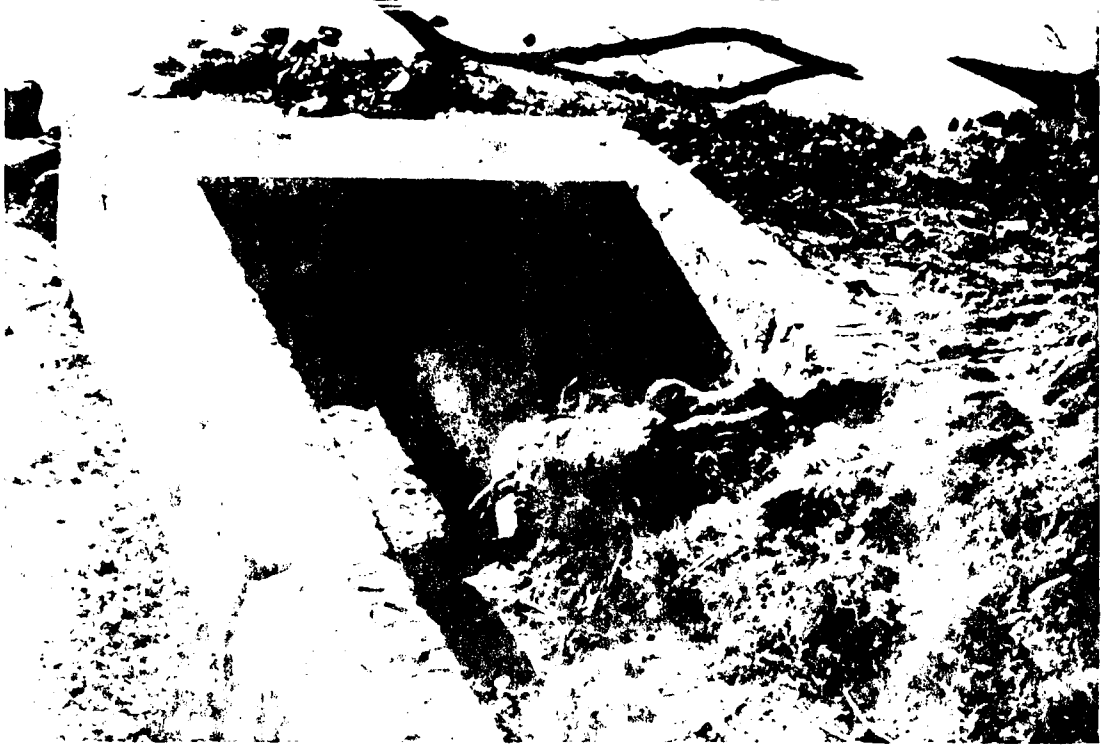
APPENDIX C



(*) Photograph No. 5 is not taken in the vicinity of Browns Pond Dam but as described by its caption

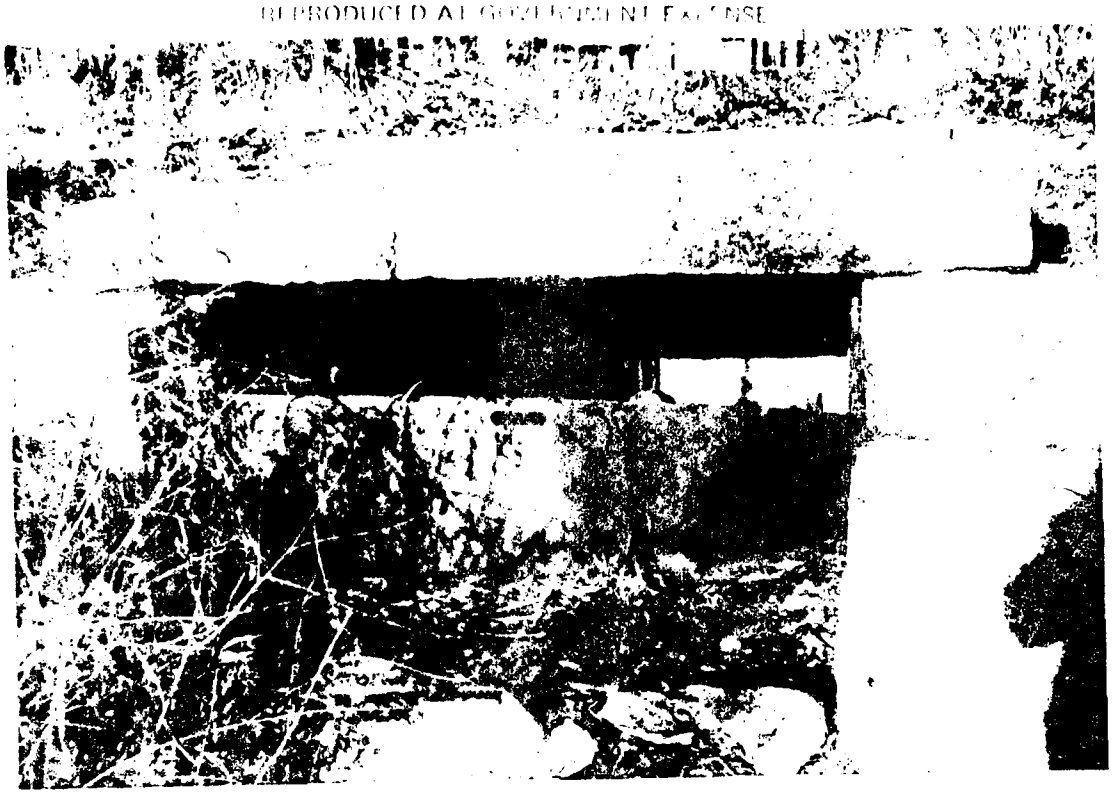
TAMS BROOKLINE MASS			US ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.
NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS			
BROWNS POND DAM			
PHOTOGRAPH LOCATION GUIDE			
NORTH RIVER BASIN			MASS
			Scale: NTS





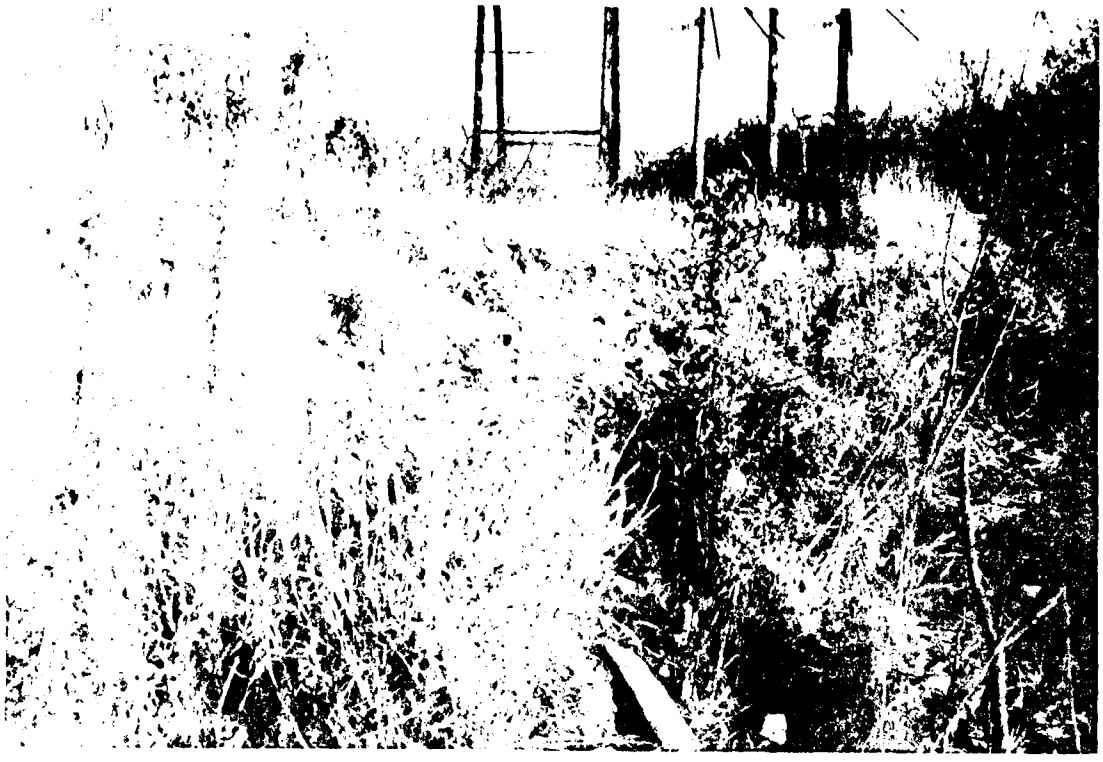
1. VIEW OF OUTLET STRUCTURE AND OUTLET PIPE. NOTE NOTCH RECENTLY CONCRETE FILLED.

2. VIEW OF OUTLET PIPE OUTFALL DITCH AND OF SEDGE POND FROM DAM STATION.



6. VIEW OF SPILLWAY LOOKING DOWNSTREAM.
NOTE STEEL PLATE FLASHBOARD AND IN BACKGROUND HEADWALL WITH ENTRANCE TO OUTLET PIPE COVERED WITH TRASH RACK.

7. VIEW OF DOWNSTREAM CHANNEL. NOTE VEGETATION.

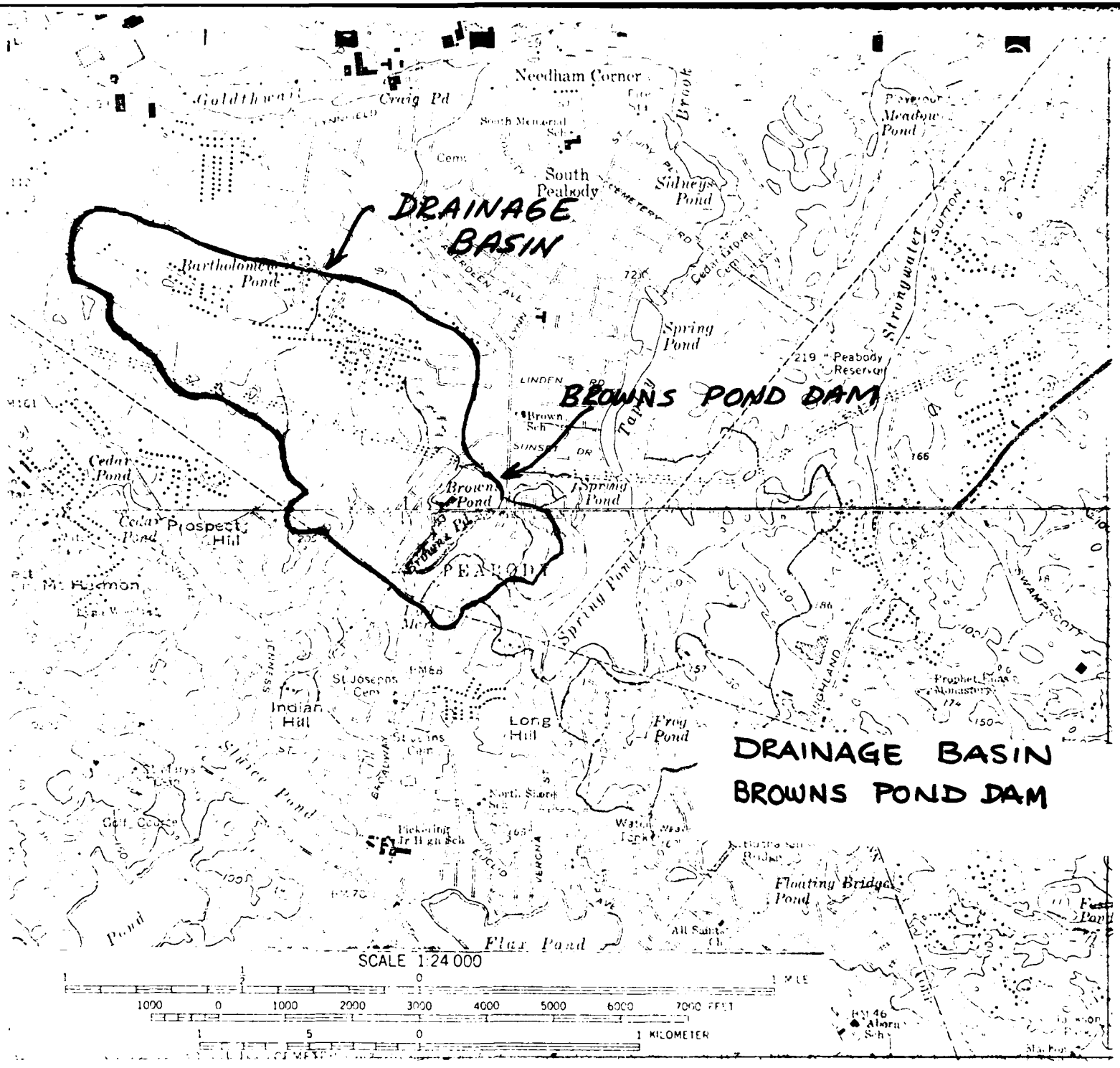


VIEW OF UPSTREAM SLOPE. NOTE SLOUGHING BELOW CREST AND DEGRADATION.

VIEW OF UPSTREAM SLOPE.

HYDROLOGIC DATA AND COMPUTATIONS

APPENDIX D



DRAINAGE BASIN
BROWNS POND DAM

TAMS

Job No. 1497-15 Sheet 1 of 9

Project INSPECTION BROWNS' POND. Date Nov 20, 1978

Subject Unit hydrograph computation. By D.L.C.

Ch'k. by

LAKE AREA (EL 73) 24.4 acres

BASIN AREA 469.9 acres / 0.734 mi²

LAND AREA 445.5 acres / .70 mi²

H = 207 ft

Mean Slope over 7,500 ft ~ 1.4 %

V = 2 fps

T_c = 65 mins / 1.08 hrs

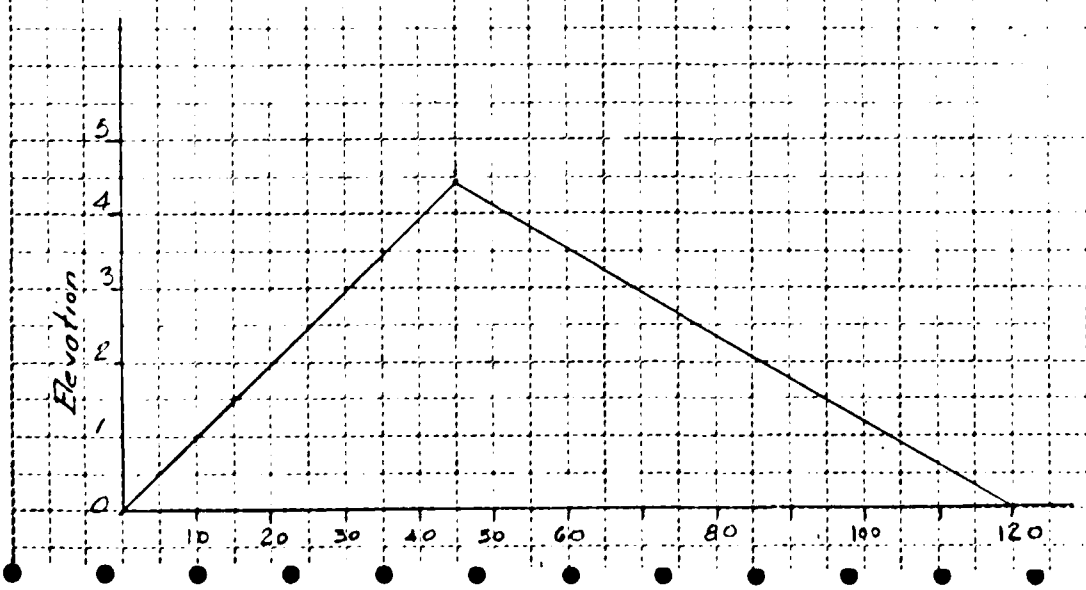
D = 12 mins / 0.2 hours.

$T_p = D/2 + 0.6\,T_c = .1 + .65$

= 0.75 hrs / 45 mins

$T_b = 2.67\,T_p = 2.00$ / 120 mins

$Q_p = \frac{484\,A}{T_p} = \frac{454(0.70)}{.75} = 469.2$ cfs



TAMS

Job No. 1497-15 Sheet 2 of 9

Project INSPECTION BROWNS POND Date NOV 21 1978

Subject _____ By D.L.C.

Ch'k. by _____

Spillway Length 60.0 ft

Crest Width 10.0 ft

Spillway crest El 79.0 ft

Low chord of CC slab walkway 81.25'

Top of walkway & Dam. 82.1'

El	Head	C	$Q = CLH^{3/2}$	Q_{dam}	Q_T
79.0	0				
79.4	0.4	2.72	4.1		4.1
80.0	1.0	2.98	17.9		17.9
81	2.0	3.30	56.0		56.
81.25	2.25	3.31	67.0		67
82.1			109.		109
83.			159.	459	618
84.			223	1383	1606
86			861	4067	4436

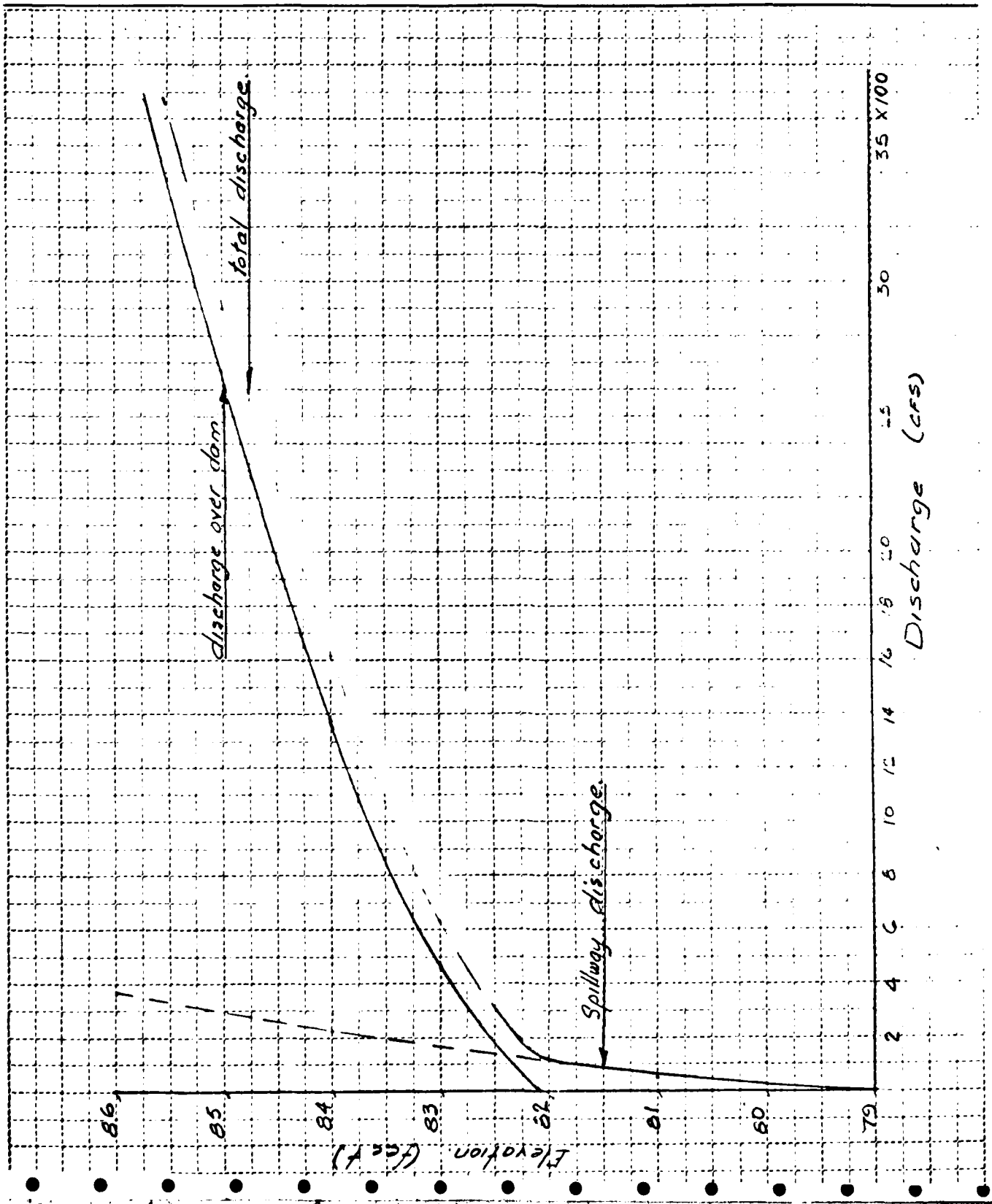
TAMS

Job No. 1497-15 Sheet 3 of 9

Project INSPECTION Date Nov 21 1978

Subject _____ By DLC

_____ Ch'k. by _____



TAMS

Job No. 1497-15 Sheet 4 of 9

Project INSPECTION BROWN'S POND Date Nov. 22, 1979

Subject Surcharge Storage Computation By D.L.C.

Ch'k. by

El.	Area *	Mean Area	Δ Vol	Surcharge Storage
*73	24.4			
77.6	37.0			0
		43.45	60.83	
79.	49.9			60.83
		50.4	20.16	
79.4	50.9			80.99
		51.7	31.02	
*80	52.5			112.01
		53.65	53.65	
81	54.8			165.66
		55.1	13.78	
81.25	55.4			179.44
		56.35	47.9	
82.1	57.3			227.34
		58.3	52.47	
83.	59.3			279.81
		60.45	60.45	
84.	61.6			340.26
		63.9	127.8	
86.	66.2			468.06

(El 77.6 is spillway crest elevation with flash-boards removed)

* Areas planimetered from USGS Quadrangle sheets for Salem & Lynn, Mass.

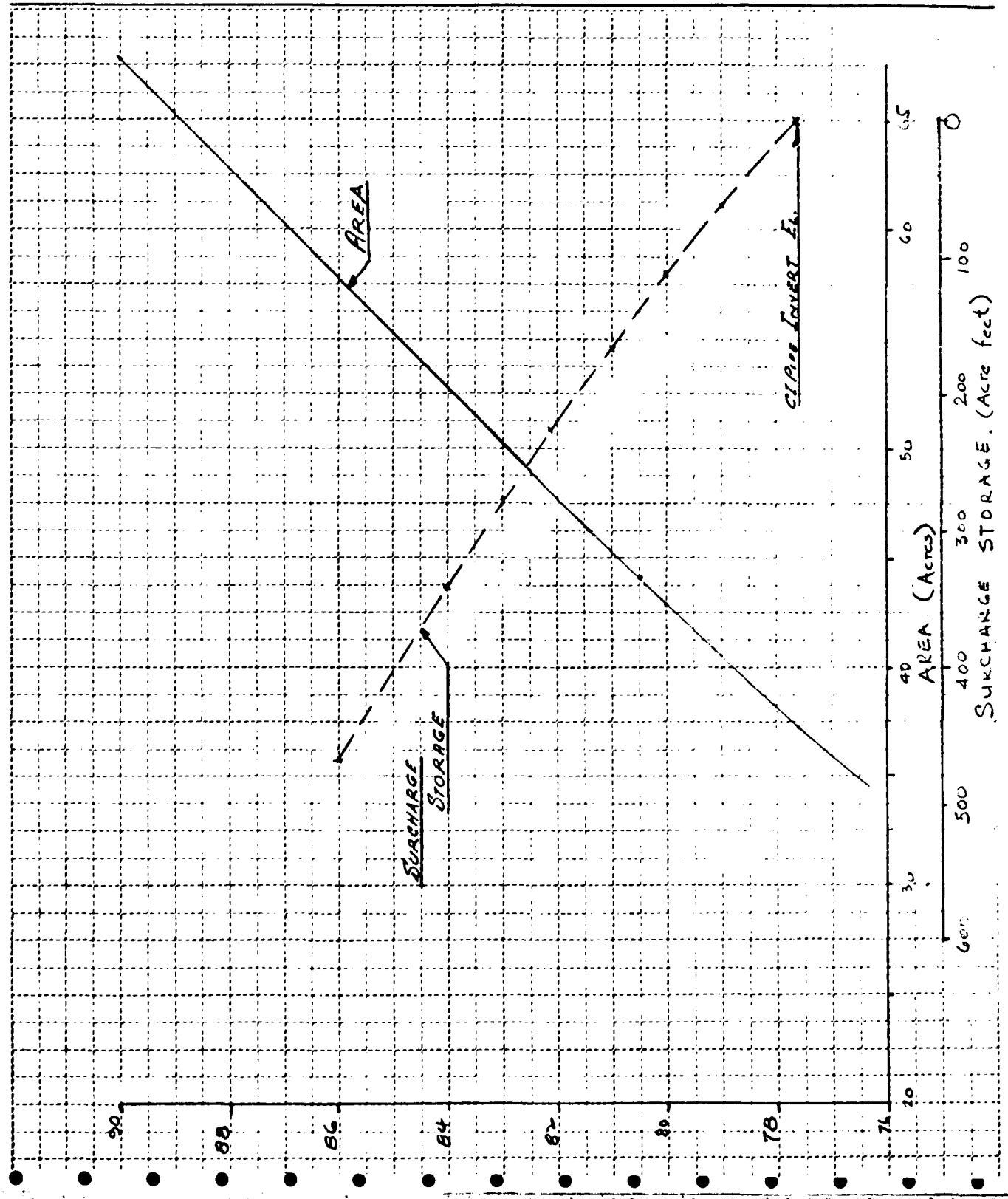
TAMS

Job No. 1497-15 Sheet 5 of 9

Project INSPECTION BROWN'S POND Date NOV 28, 1978

Subject _____ By _____

_____ Ch'k. by _____



BROWNS POND PEABODY MASS.
RESERVOIR ROUTING JOB NO 1497-15
TAMS DAM SAFETY INSPECTION

100 YEAR STORM

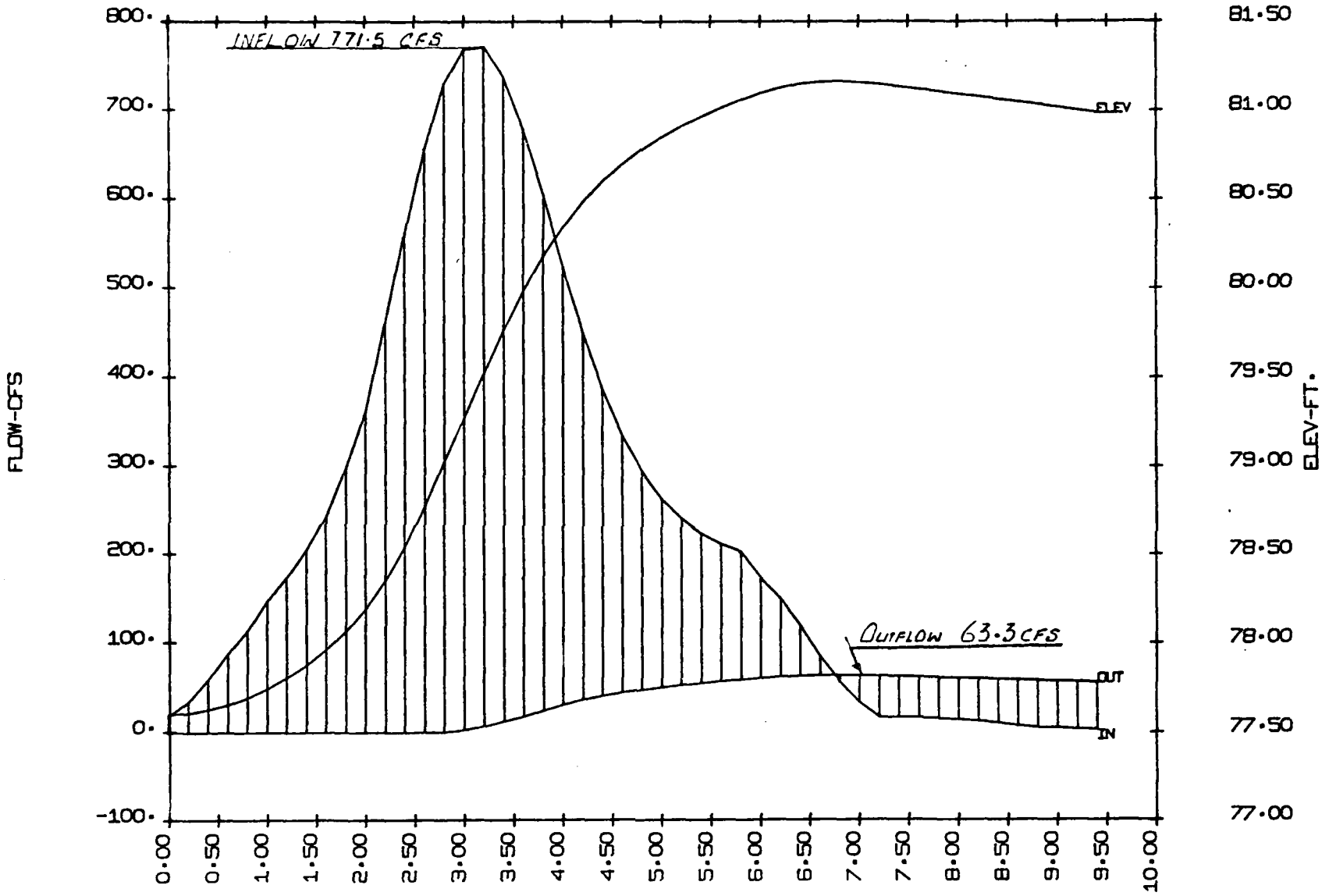
INPUT PARAMETERS

STARTING ELEV (FT.)	TIME INTERVAL (HOURS)	STARTING TIME (HOURS)	ENDING TIME (HOURS)	PRINT INTERVAL	GATE OPTION	PLOT OPTION	STORAGE COEF.	OUTFLOW COEF.	INFLOW COEF.	TIME COEF.	BREAK TIME
77.60	0.20	1.00	9.80	1	NO	YES	1.000	1.000	1.000	1.000	0.000

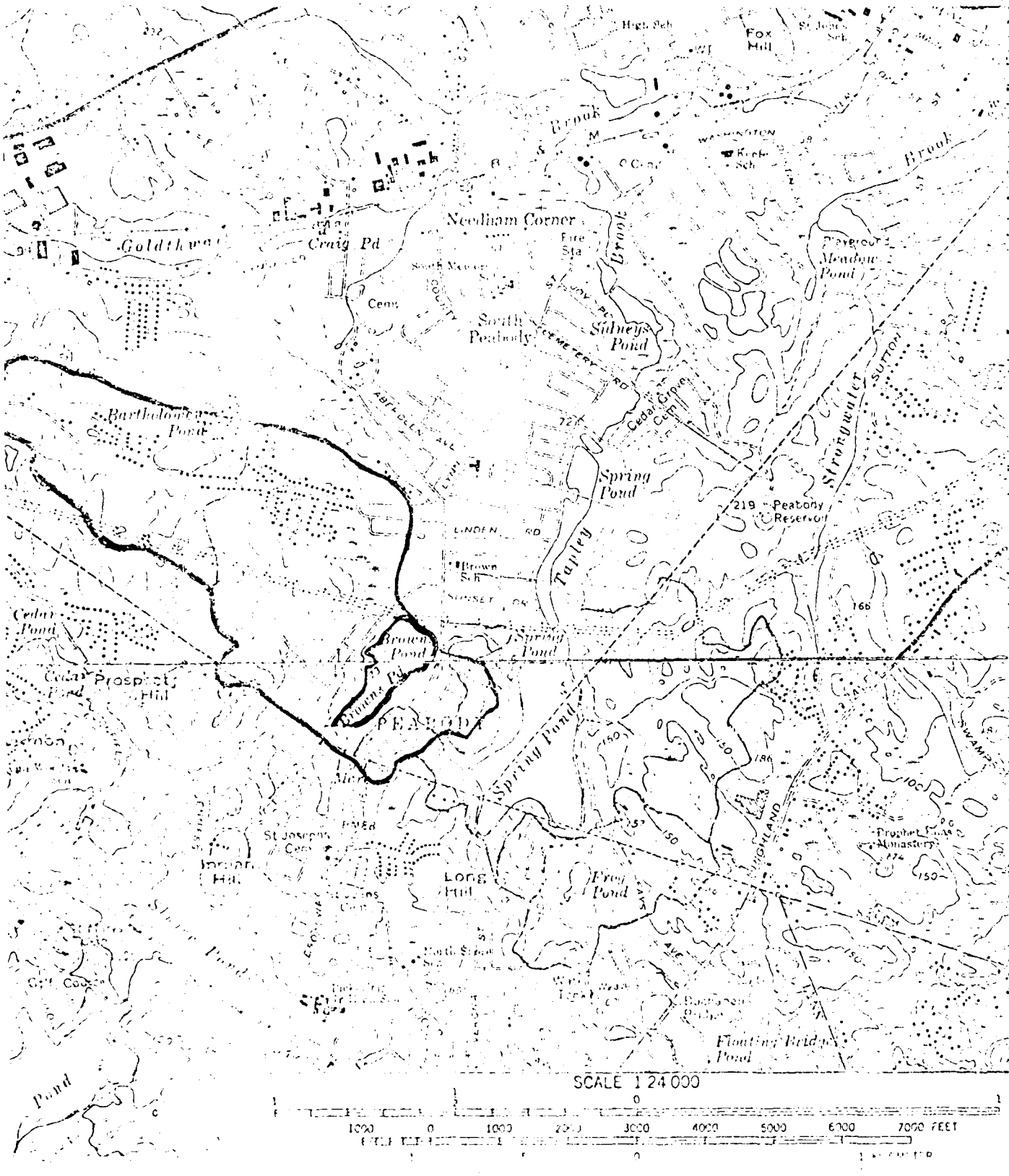
RESERVOIR ELEV. (FT.)	RESERVOIR STORAGE (ACFT)	RESERVOIR OUTFLOW (CFS)
77.60	0.0000	0.00
79.00	60.8300	0.00
79.40	80.9900	4.10
80.00	112.0000	17.90
81.00	165.7000	56.00
81.25	179.4400	67.00
82.10	227.3400	109.00
83.00	279.8100	618.00
84.00	340.2600	1606.00
86.00	468.0600	4436.00

TIME (HRS)	INFLOW (CFS)	OUTFLOW (CFS)	STORAGE (ACFT)	ELEVATION (FT.)
0.00	0.00		0.0000	77.60
0.20	19.57	0.00	0.1535	77.60
0.40	34.07	0.00	0.5887	77.61
0.60	58.46	0.00	1.3535	77.63
0.80	87.73	0.00	2.5618	77.65
1.00	113.67	0.00	4.2263	77.69
1.20	147.25	0.00	6.3827	77.74
1.40	173.47	0.00	9.0733	77.80
1.60	204.60	0.00	12.1579	77.87
1.80	242.94	0.00	15.8567	77.96
2.00	295.11	0.00	20.3282	78.06
2.20	361.72	0.00	25.7815	78.19
2.40	461.20	0.00	32.5926	78.34
2.60	562.41	0.00	41.0422	78.54
2.80	655.97	0.00	51.1116	78.77
3.00	729.97	0.35	62.5648	79.03
3.20	769.60	2.86	74.9231	79.27
3.40	771.51	7.03	87.5776	79.52
3.60	738.15	12.51	99.8927	79.76
3.80	679.05	17.60	111.3479	79.98
4.00	604.82	24.71	121.6012	80.17
4.20	523.50	31.00	130.4657	80.34
4.40	450.03	36.21	137.9550	80.48
4.60	385.64	40.76	144.2244	80.60
4.80	333.90	44.48	149.4666	80.69
5.00	293.88	47.62	153.8937	80.78
5.20	262.59	50.31	157.6832	80.85
5.40	240.08	52.65	160.9866	80.91
5.60	223.36	54.74	163.9291	80.96
5.80	211.06	56.71	166.5986	81.01
6.00	202.53	58.69	169.0628	81.06
6.20	172.53	60.38	171.1784	81.09
6.40	149.57	61.70	172.8314	81.12
6.60	119.10	62.66	174.0240	81.15
6.80	84.24	63.17	174.6645	81.16
7.00	55.60	63.26	174.7753	81.16
7.20	32.96	63.01	174.4636	81.15
7.40	16.38	62.51	173.8340	81.14
7.60	16.20	61.90	173.0751	81.13
7.80	16.00	61.30	172.3229	81.12
8.00	15.00	60.70	171.5708	81.10
8.20	14.00	60.09	170.8122	81.09
8.40	12.00	59.47	170.0389	81.07
8.60	10.00	58.83	169.2430	81.06
8.80	7.00	58.17	168.4164	81.04
9.00	5.00	57.48	167.5597	81.03
9.20	5.00	56.79	166.6978	81.01
9.40	3.00	56.10	165.8309	81.00
9.60	3.00	55.47	164.9584	80.98
MAX. VALUES	771.51	63.26		81.16
MIN. VALUES	0.00	0.00		77.60

—BROWNS POND—



6 of 8


Needham Corner
Fire Sta
Goldthwait
Craig Pd
South Peabody
Sidneys Pond
Bartholomew Pond
Spring Pond
Tapley Brook
Peabody Reservoir
Brown Pond
Cedar Pond
Prospect Hill
PEABODY
Long Hill
Frog Pond
Floating Bridge Pond
Fox Hill
Meadow Pond
Strawberry Hill
SCALE 1 24 000
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

INFORMATION AS CONTAINED IN THE
NATIONAL INVENTORY OF DAMS

APPENDIX E

INVENTORY OF DAMS IN THE UNITED STATES

STATE	IDENTITY NUMBER	DIVISION	STATE	COUNTY	CONGR DIST	STATE	COUNTY	CONGR DIST	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY | MO | YR
MA	1[illegible]	1[illegible]0	MA	009	06				BROWNS POND DAM	4230.1	7057.2	00DEC78

POPULAR NAME	NAME OF IMPOUNDMENT
	BROWNS POND

REGION	BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	DIST FROM DAM (MI.)	POPULATION
		TR TAPLEY BROOK	PEABODY	0	48100

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT.)	HYDRAULIC HEIGHT (FT.)	IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	IMPOUNDING CAPACITIES NORMAL (ACRE-FT.)
REPG	1900	R	5	6	280	54

DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
NED	N	N	N	N	15JAN79

REMARKS

D/S HAS	SPILLWAY CREST LENGTH	SPILLWAY TYPE	SPILLWAY WIDTH (FT.)	MAXIMUM DISCHARGE (FT.)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO.	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
3	200	C	6	67												

OWNER	ENGINEERING BY	CONSTRUCTION BY
CITY OF PEABODY		

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

INSPECTION BY	INSPECTION DATE DAY | MO | YR	AUTHORITY FOR INSPECTION
	06FEB68	PL-92-367

REMARKS

END

FILMED

7-85

DTIC